

CHIEF EXECUTIVE OFFICERS IN AMERICA:
IS THERE A RELATIONSHIP BETWEEN THEIR BACKGROUNDS
AND THEIR COMPANY'S PERFORMANCE?

by

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Submitted to the Alfred P. Sloan School of Management
in Partial Fulfillment of
the Requirements of the Degree of
Master of Science in Management

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ABSTRACT

Much has been written recently on the importance of cross functional training and cross functional backgrounds. The new corporate ladders are going to be horizontal with employees jumping from function to function instead of moving up entirely within a single function. This study looks for historical evidence of a Chief Executive Officer's performance based on his or her functional and educational background.

This study looks at the performance of large Fortune 50 companies over the past ten years as measured by four common measures of corporate performance during this period. These measures, percent increase in stock price, percent increase in sales, percent increase in earnings and percent increase in earnings per share are compared to industry averages to compensate for cyclicity and properly evaluate the CEO versus his peers. This study also looks at the Chief Executive Officers who ran the companies during this ten year period. The CEO's functional background, how he (all CEOs in the study were male) came up through the company, the CEO's undergraduate degree and the CEO's graduate degree are all used separately to group CEOs with similar backgrounds or degrees. The performance of these groups are then analyzed.

The data in this study indicate that in aggregate there is a difference in performance between CEOs with different functional career paths and different educational degrees. This does not imply causation because of the many variables involved, but none-the-less there is a performance difference. Tests of statistical significance indicate that the fluctuations in performance may be from chance due to the small sample size of some of the categories.

CEOs with a functional background in administration, marketing and the legal department outperformed the average CEO and out performed CEO's with different functional backgrounds in the four measures of this survey. CEOs with a background in sales and finance performed the worst.

The type of undergraduate degree was not significantly related to the performance level. However, there was a performance gap between those CEOs with a degree and those who never finished college (the poorer performers).

Finally, graduate education in aggregate did not enhance the CEOs level of performance. When broken down by type of graduate degree, the doctorate recipients and the JD degree recipients outperformed the other post-bachelor degree holders including MBAs.

Thesis Supervisor: Dr. Arnold Barnett
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INTRODUCTION

Corporate performance is and always has been an important and controversial topic. Thousands of studies have been conducted by industry and academics to try to determine what affects corporate performance. Once the drivers of corporate performance are identified, manipulating them would improve corporate performance which can yield large profits. Lately cross functional teams and backgrounds have been credited with helping groups, divisions and corporations achieve superior results and make progress in previously stagnated areas by rapidly disseminating information and creating buy-in in the process. In the future this is expected to be the new corporate career ladder.¹ Is there any evidence that corporate leaders with a cross functional background outperform their compatriots that have been less diverse while advancing in the company? There has also been rhetoric in the press about how short term focused managers are sacrificing companies long term in order to get results immediately. Reports of research and development being slashed to make the current objective are common and have been blamed for one reason why American companies can not compete with the Japanese or Germans. Is there any evidence that CEOs who have financial backgrounds have fallen prey to myopic goals and underperform?

Stereotypes of managers exist in industry based on the managers career path through the company. As mentioned above finance oriented managers are accused of running the company by ratios and financial objectives and forgetting about the customers. But finance is the background of 31% of the CEOs in America's 1000 largest companies, being the most popular background, are they fooling corporate boards or are they performing well? Management Practices Inc., a New York based management consulting firm, claims that CEO's who have a strong financial education are best suited to meet the challenge of adding value to corporations.² Marketing

¹ Wall Street Journal, March 15, 1993, Page B1.

² Financial Executive, Page 7.

managers, 27% of the CEOs, were formerly a group accused of ignoring the true costs of goods and focusing too much on sales and the customer at the expense of the organization. Other backgrounds like operations are accused of ignoring the financial institutions and the customers. These are unfair generalities but they probably have their roots in some truth as they appear in the press so often. There is however, a tendency for people to concentrate on what they know best which would lead financial managers to run a company by the numbers and not the customers.

Besides concentrating on what is comfortable, managers can perform best in areas that are the easiest or the most convenient. A manager who has progressed through the company in only a marketing function will have many friends and contacts in this area. Information can be obtained easily without a threat to the lower manager's power. In fact, there is even an incentive for lower level managers to work closely with the CEO to get more recognition and power.

Another popular stereotype in industry is the engineer-turned-manager who gets promoted because of engineering skills. The department suffers because of the great difference between managing skill and engineering skills. This stereotype has recently been countered by a trend to get closer to the product in which managers that understand the product and process best supposedly perform the best. Is there any truth to these stories? Each of these stereotypes might be true in some situations but every person is different and it is impossible to make such broad characterizations. Some people can handle all of the different responsibilities and master all of the skills. But what are the right skills and how do you measure them?

For that matter, does education make a difference in performance? Of the largest one thousand companies, a surprising 84 are run by CEOs without a college degree. The most common degree is business but does this matter given that the average CEO has been at his company for 23 years?³ We have been led to believe that

³ Business Week, October 19, 1990, Page 13

the more education one has the better he or she will be able to perform. Is this the case in the real world of the Fortune 50, or is education just a requirement caused by increased job competition? Does a graduate degree help the CEO outperform his⁴ counterparts who have not pursued and received a graduate degree? Do people who have studied engineering as an undergraduate perform less well than others who studied business?

Answering these subjective questions is difficult. It is possible, however, to see if CEOs with engineering backgrounds performs as well as those without them. All of the different backgrounds can be compared in aggregate. Do companies with Chief Executive Officers in marketing out perform companies with CEOs who have come up through the finance ranks? Are generalists better?

I have attempted to answer these questions by looking at historical data. This thesis is not intended to prove that one background is better than another, or that differing backgrounds cause the performance differences. I will limit myself to exploring whether there is a relationship between certain backgrounds, degrees and the associated company's performance. Some important factors that influence a company's performance will not be fully considered in this thesis. However, I hope for suggestive results even if not utterly definitive ones.

⁴ There were no women CEOs in the survey.

METHODOLOGY

Selecting Companies:

Companies for this study were selected from Fortune Magazine's annual list of the 500 largest American corporations as determined by annual sales. This list was used because there would be public information on the performance of the company for a reasonable amount of time. Additionally, there would be information available on the company's chief executive officers backgrounds because of the size, importance and public interest in these firms. Fortune's requirements are that all of the companies must derive more than 50% of their sales from manufacturing or mining and that they must provide financial data.⁵ The Fortune 500 is not heavily biased towards the most successful companies since it ranks solely based on sales. Therefore the top fifty companies are only common in terms of sales and not profits. One can not claim that these are the most successful, for a lot of sales without profit is not success. Additionally, most of the companies in the survey are competitors with each other.

Still, companies may temporarily get big because of their successes. To avoid a bias on successful companies I went back to 1971 and took the names of Fortune's top 50 companies of that year. I then took the names of the companies that were listed in Fortune's 1991 list and combined them with the names from 1971 to get the list of companies for my study. Several companies on the 1971 list went private, were merged or were drastically down sized before 1982 (the starting year for the study) and were therefore excluded because they no longer fit the profile of large public corporations. This left 68 companies for my study; they are listed in Exhibit 1.

In 1991, the last year of my study, 57 of the 68 companies in my study remained public corporations. Of the eleven companies that left the list, seven were

⁵ Fortune, April 19, 1993, page 206.

acquired by other Fortune 50 firms in the study, one was bought by an international company and the remaining three have fallen off of the list of the largest 500 companies in the United States as determined by Fortune. These firms remained in my survey until the last year of independent operation (the three that have fallen off the Fortune 500 list remained in the study).

Duration:

I used the period from 1982 to 1991 because it was the most recent period for corporate performance data. I selected ten years because I wanted a period that was long enough to provide data on several CEOs per company. This allowed me to measure first and last year performance in addition to total performance during the CEO's tenure. The long period would also provide a mixture of CEOs with short tenure and those CEOs with a long tenure. Another reason for the recent focus is that as one proceeds back in time, data is harder to retrieve. All of the business magazines that were the primary sources of the data (Business Week, Forbes and Fortune) tended to report less information on companies and performance in the earlier years. Furthermore the data that they reported changed with the current trends of the times. One year return on assets was reported; the next it was return on equity.

Performance Measures:

I considered many different measures of performance for this study. The four that I choose, percent increased sales, percent increased earnings, percent increased stock price and percent increased earnings per share, are commonly accepted measures of performance. There are benefits and drawbacks to each. The measures also tell different stories but that is one of the reasons why I chose them. These measures are publicly reported and readily available for the entire ten year period. Return on equity and return on assets are additional measures but were not universally reported during this period. Furthermore, different asset valuations would make a direct comparison difficult. More progressive measures such as customer satisfaction might have led to

interesting correlation but this information is subjective, sometimes proprietary and is probably not collected in many of the companies.

Percent increased sales was chosen as one measure of performance for many reasons. First, sales is very easy to measure without room for interpretation and the data is very readily available. Sales of products is a high profile measure because of magazines such as Fortune and therefore is watched closely. Sales is also a measure of size and therefore it can also be considered a measure of power. With some professionals hypothesizing that managers are driven by power and recognition, sales was a logical choice of performance measurement. My interest was to see if any types of CEO's were especially good at increasing sales and whether this increase occurs at the expense of the other areas of performance. Sales is easy to increase rapidly but the growth can reduce profits if not managed correctly.

The yearly percent increase in sales was taken directly from Fortune's annual Largest 500 Companies Edition for the ten year period. Where the percent change was not given, I simply computed it using the sales figure from that year and the previous year. For appropriate comparisons, industry sales data was taken from the same Fortune edition. I classified companies into the same industries that Fortune and Business Week classified them. IBM is in the computer business, and is compared to DEC and the other Fortune 500 companies also in the computer industry. Companies such as RJR Nabisco introduce a possibility for error since it is tough to categorize them as mainly food or mainly tobacco. However a choice had to be made and I used Fortune's logic which is based on where the largest percentage of revenue is derived. In the years when the company was in both businesses, the industry averages were fairly similar which makes the comparison more reliable.

Percent earnings growth is the second measure of performance and some argue a very accurate method of value added to a company. Researchers Ball and Brown state, "Of all the information about an individual firm which becomes available

during a year, one half or more is captured in that year's income number. Its content is therefore considerable."⁶ Many CEO's have "increased earnings" as a part of their individual performance objectives that are tied to compensation. But earnings today can be manipulated easily in the short term by pushing the costs in the future or by sacrificing current investment that will also hurt future performance. It is tough to know whether earnings are coming from better operations or from short term manipulations. Quality of earnings is more important than quantity, and we would not want to focus exclusively on the latter. However stock price changes should give a measure of what the institutional investors think about the long term prospects of the company. Earnings growth, like sales growth, was taken from Fortune magazine and hand calculated where the percentage increase was missing. Industry averages were used and assigned in the same manner as sales.

Percentage increase of stock price is the third measure of corporate performance. This is an objective measure based on what investors (the market) feel the company is worth and what the company's future growth opportunities are worth. With an efficient market, all information on the company and its prospects that are available, are known and reflected in the stock price.⁷ Theoretically we learn that the value of the firm is the free cash flow generated by the firm over its entire life of the business discounted at the appropriate discount rate. Stock price increases should help provide an objective anchor for increases in both sales and earnings. A drastic difference in stock gains versus sales, earnings or earnings per share (EPS) gains will tell us that the market thinks there is a secondary and more important factor involved in these changes and hence the increase (or decrease) is not significant.

Stock prices were taken from Business Week's annual corporate performance edition. Stock price was not listed for several years and for several companies during

⁶ Foster, Financial Statement Analysis, Page 389.

⁷ Stewart C. Myers, Corporate Financing Decisions Lecture, Fall 1992.

other years. For these times I looked up the stock prices in the Daily Stock Price Record Book. I used the price on the same day that was listed in the footnote of the magazine to avoid timing errors in the market. Stock splits were frequent during this ten year period and were compensated for by using a simple ratio. Outstanding common shares data and notices were used to check if there was a split. Stock buy backs were treated as a tool of management as they tend to signal to the market that management feels that the stock is under priced.⁸ Even though it has the same concentrating effect (as dilution with new issues) on the stock price, the repurchases were ignored in calculating the stock price.⁹ This is standard industry practice for calculating stock performance and is a result of the strategic nature of the transaction and the small number of shares involved.

Percent increase in Earnings per share (EPS) is the fourth and final measure of performance and in most cases was very similar to increased earnings. However earnings per share will help tell if a stock increase was achieved through certain financial manipulations such as stock buy backs or mergers. Many stock market analysts measure a company's value by multiplying the EPS by the price earnings multiple, which leaves an incentive to influence EPS. Additionally, many CEO's performances are judged and rewarded by EPS targets. That is why EPS is the fourth measure even though some industry experts like G. Bennett Stewart find it irrelevant.¹⁰ One can argue it is important because it is strongly affected when additional common stock shares are issued, which is generally seen by the market as a negative signal and indicates performance.¹¹ There are also other methods of manipulation. Professor Paul Asquith notes that market analysts felt that many CEOs acquired companies based on EPS for the effect known as "EPS gain." This results when a growth company with

⁸ Ibid.

⁹ Stewart C. Myers, Corporate Financing Decisions Lecture, Fall 1992.

¹⁰ G. Bennett Stewart, Market Myths, Page 7.

¹¹ Myers, Class Lecture.

a high P/E ratio acquires a mature company with a low P/E ratio. The combined company's EPS rises.

Data was taken from both Fortune and Business Week and the percentage change was calculated. All data was adjusted for stock splits but as with the rest of the performance measures, none of the data was modified for mergers, acquisitions or stock buy backs.

CEO Backgrounds:

The Chief Executive Officer was chosen because he has the most influence over the operation of the company and is directly responsible for its performance, reporting only to the Board of Directors which in the 1980's was very supportive of the CEO.¹² Additionally, nearly half of the CEOs also have the title, Chairman of the Board. Twenty five percent of the CEOs are also presidents of their company and a large twenty seven percent are presidents, CEOs and Chairman.¹³ Forbes Magazine has an annual list of the Chief Executive Officers. From this magazine I was able to get the names of most of the CEO's and their tenures. On several occasions, the CEO departed in mid year. If the CEO was in office for at least six months, he was credited with the entire year for the purpose of this study. This introduces the possibility for some error but mid-year departures were infrequent.

Forbes listed their functional backgrounds by how they progressed in their career up until that time. Because of the changes during the ten year study period, 130 CEOs managed the 68 companies. This information is listed in Exhibit 2. CEO's functional backgrounds were listed as administrative, marketing, sales, general, finance, legal, technical or operations depending on where they spent the majority of their time during their career to date. Several of the oil industry CEOs were listed as "Production," to be consistent I reclassified them as "Operations."

¹² Paul Asquith, Course 15.545 Spring 1993.

¹³ Business Week, October 19, 1990, Page 13.

For some of the years Forbes also listed the CEO's undergraduate and graduate degrees. This information is listed in Exhibit 3. However, much of the information was missing and I wanted to perform a check on the functional backgrounds of the CEOs that were classified in Forbes. Therefore, data was collected and verified using Who's Who in Finance and Industry and Standard and Poors. This information allowed me to make a direct comparison between backgrounds, degrees and performance. Undergraduate degrees posed some problems because there are many different types of degrees and different schools use different notations for the same degrees. Therefore I listed the degrees as only being a bachelors of science or bachelors of arts which split naturally. Further deviations into the exact type of degree would have yielded a small sample size with large uncertainty. The BS degrees were all of the technical degrees including the sciences and engineering. Art's degrees were listed as such and included business, history and other degrees.

Analysis:

All data was collected for each year of the study between 1982 and 1991. Using this data I have calculated the performance by each measure for every year of the CEO's tenure. The year's performance was simply matched with the CEO who was in office during that year. The data I will report will be for the entire tenure, the first year as Chief Executive Officer and the last year as CEO. The first year is defined as the first year or period of at least six months that the manager acted as Chief Executive Officer. The last year is defined similarly which contributed to some companies never entering into the first or last year performance calculations. (Jack Welch of General Electric has been in tenure during the entire period of this study) This break out of years will show us the difference in performance during three important times of the CEO's tenure. If forced out the CEO's last year should be his worst (if that is the reason he is forced out) but if he leaves on his own, he might want to leave on a high note. Thus there are no clear predictions for last year performance except that, past

performance has been a major explanatory factor in most models of organizational learning.¹⁴ This would indicate that there is a large relation. However the causes of such a relation require intimate details of the inside of the corporate boardroom and are beyond the scope of this paper. There are many other possibilities. First year performance should indicate the strength of the CEO forcing change. The tenure figures of performance (those for all of the years) will provide most of the data on how the CEOs with various backgrounds performed since it contains the most data and represents the CEO accurately. Based on this, a strong hypothesis would be that the first year in general should out perform the last year and the last year should be less than the tenure average. There is a possibility for a lag effect but this future effect should be shown by the stock price change.

The performance was calculated using basic mathematical formulas except as noted below. The percent increase from year to year was calculated with the standard formula of $(1991-1990)/1990$ for the situations where the growth was positive. Where there was negative growth (primarily in earnings and EPS), the numbers were reversed and the result was then recorded as negative to make the performance symmetric. This was done primarily to make the averaging of negative and positive growth numbers meaningful. This neutralizes the effect that a -50% growth rate is the same magnitude as a 100% growth rate. Additionally, there were only a few companies whose earnings and EPS swung greatly on a percent basis for several years. The traditional formula would have unfairly bounded the negative growth years. Fortunately, most of the firms performance were fairly stable (they did not have large swings in performance) over the ten year period. Furthermore most firms were stagnant or grew slowly which adds to the reliability of the study. Only when compared to the industry average did notable (15%) differences occur.

¹⁴ Lant, Strategic Management Journal, Page 589.

The performance versus the industry standard for every company for every measure in every year is listed in Exhibit 4. It was calculated by subtracting the industry performance from the company's performance. If a company achieves earnings increases greater than the companies in its industry, the corresponding number will be positive. Likewise if the industry outperforms the company, a negative number will be listed. The chief executive officers with a particular background are being compared against the industry average based on the type of company that they run (the industry average is a composite with CEOs of various backgrounds running competing companies). The CEO's in this study are not being compared directly against CEOs with like backgrounds in the same industry. Percent difference compared to industry wide change, was not used because it would overstate small changes in performance during periods of relative stagnation.

Once all of the data was collected and organized by CEO, it was then sorted by functional background. A statistical analysis was performed in which the averages and standard deviations were calculated. The process was repeated and the database was sorted by undergraduate degrees and graduate degrees. Large permutations of various combinations of the 130 CEOs different background characteristics produced many sample sizes that were very small. Tests of statistical significance were then performed on the data.

Please note that all of the numbers listed in the results table that follow are compared to the industry averages.

RESULTS

General:

The one hundred and thirty CEOs that ran the 68 firms in the study over the ten year period from 1982 to 1991 performed only as well on average as their peers in the rest of industry. This confirms the fact that the Fortune list is only sized based, not performance based. As can be seen by Table A below, earnings increased 1% greater than the industry averages but the stock price and earnings per share fell very slightly. In their first year the CEOs reduced sales compared to their counterparts and increased earnings and EPS.

Table A

ALL CEOs (130)	% Increase Sales	% Increase Earnings	% Increase Stock Price	% Increase EPS
All Years	0.28	1.08	-0.25	-3.93
First Year	-1.95	34.45	-2.50	28.50
Last Year	-1.43	-50.29	0.47	-52.79

The stock price did not view these actions favorably relative to the rest of the industry. In the CEO's last year in office, their stock price was the only factor that beat industry which tells us that the large earnings and EPS decreases compared to industry was expected or the market was glad that the CEO left. This is when each CEO's tenure is considered to be a discrete data point. When considered on a yearly basis (tenure weighted by the amount of years served to eliminate the potential bias of CEO duration), the CEO averages were similar but more pronounced. The percent increase sales was 7.95%, the percent increase in earnings was 5.78%, the increase in stock price was -4.49% and the increase in EPS was -11.91%.

Functional Performance:

In the survey 32% (41) of the CEOs progressed through technical paths, 20% (26) came up through finance, 13% (17) through marketing, 12% (15) through operations, 8% (10) had general backgrounds, 7% (9) had administration backgrounds, 5% (7) came up through sales and 4% (5) have a legal background. Looking at the way CEOs progressed throughout their career independent of all other factors reveal that:

- CEOs with an operations background had the greatest stock price appreciation, while finance and sales CEOs had the worst appreciation.
- Marketing CEOs increased sales the most while CEOs with a sales background increased sales the least compared to the industry.
- Administrative (highest EPS and earnings), Marketing and Legal CEOs had the best performance overall while finance (lowest EPS and earnings) and sales had the worst performance overall.

Overall ranking among various backgrounds are listed below by performance criteria. The bars with the "plus" sign below show the cut off for beating the industry average.

Rank	Sales	Earnings	Stock	EPS
1	Marketing	Administration	Operations	Administration
2	Legal	Marketing	Administration	General
3	Administration	Legal	<u>Legal +</u>	Legal
4	<u>Technical +</u>	General	Marketing	<u>Marketing +</u>
5	<i>Finance</i>	<u>Technical +</u>	Technical	Technical
6	Operations	Operations	General	Operations
7	General	<i>Sales</i>	<i>Finance</i>	<i>Sales</i>
8	<i>Sales</i>	<i>Finance</i>	<i>Sales</i>	<i>Finance</i>

Administration and legal were the only backgrounds that were above average in all four performance measures. Marketing was close and led in sales. The stock market liked operations CEOs the most compared to their industry counterparts, but such CEOs performed below average in every other category. Generalists, sales and finance performed the worst. Sales and marketing backgrounds were unique in that

sales CEOs had the highest stock appreciation in their first year in office and the lowest appreciation in their last year in office. Marketing CEOs were just the opposite with their highest stock price performance coming in their last year.

In order to quantify the performance, I used a weighted average of the four performance measurements to rank the Chief Executive Officers. I weighted the measures by what I felt to be the order of importance in actual company performance. Stock price appreciation received 50% weighting, percent earnings increase was 30%, EPS was 10% and finally sales increase was also 10%. Using this rating system, three clear groups emerged; Good performers (6 to 16% above average) were the Administration CEOs, the Marketing CEOs and the Legal CEOs; Average CEOs (0 to 3% above average) were General, Operations and Technical CEOs; and the poor performers (9 to 12% below average) were the Sales and Finance CEOs. Tests of statistical significance were performed and are discussed later in this section.

Technical Backgrounds

Chief Executive Officers that followed a technical career path had mixed results compared to their industry counterparts. As can be seen in table B, they had large earnings increases in their first years that were discounted by the market. In fact their

Table B

CEO's with a Technical Path (41)	% Increase Sales	% Increase Earnings	% Increase Stock Price	% Increase EPS
All Years	0	4.78	-1.27	-3.39
First Year	-3.72	22.76	-2.22	-5.48
Last Year	-2.97	55.82	0.23	-58.00

last year they performed the worst in all categories except for stock price which was the best. Overall their performance is below their counterparts in this survey and in industry.

Finance Backgrounds

Financial CEOs performed poorly compared to their industry equals in every category, they even did so compared to the other functional background groups in this study. Table C shows quick earnings increases in their first year that the market did not

Table C

CEO's with a Finance Path (26)	% Increase Sales	% Increase Earnings	% Increase Stock Price	% Increase EPS
All Years	-0.36	-26.81	-3.26	-27.70
First Year	0.06	122.00	-10.70	74.38
Last Year	0.39	-79.45	-4.64	-62.95

think was adequate. Furthermore their final year performance was worse than their average. Sales did not deviate from the industry averages.

Marketing Backgrounds

Marketing background CEOs outpaced their colleagues in sales by a little and

Table D

CEO's with a Marketing Path (17)	% Increase Sales	% Increase Earnings	% Increase Stock Price	% Increase EPS
All Years	2.95	22.60	-0.82	0.01
First Year	1.20	8.75	-11.30	14.20
Last Year	-0.33	-100.00	9.80	-118.14

earnings. Curiously they had an average performance in stock appreciation and EPS as shown in Table D. First year performance shows earnings and EPS beating their industry counterparts while their stock price lagged. In their final year this same phenomena reversed itself oddly enough.

Operations Backgrounds

Table E shows that fifteen CEOs with an operations background lag their cohorts in all categories except for the most revealing, stock appreciation which was by far the best of all groups. In their first year, they performed very well in earnings

Table E

CEO's with an Operat'ns Path (15)	% Increase Sales	% Increase Earnings	% Increase Stock Price	% Increase EPS
All Years	-1.37	-7.06	9.87	-8.73
First Year	-4.20	111.38	9.25	114.06
Last Year	4.30	-42.90	6.40	-42.11

and EPS. They also have a 9% excess stock appreciation over their industry rivals while cutting sales relative to the industry. Their last year showed higher sales and much lower profits with still positive stock appreciation.

General Backgrounds

As can be seen in Table F, the cross trained general career path CEOs who spent time in several functional departments did not beat their counterparts in sales increases or stock appreciation. This is counter to my predictions prior to this study. They performed slightly better in earnings and EPS. Their first and last year performance was poor in all categories except for stock price appreciation.

Table F

CEO's with a General Path (10)	% Increase Sales	% Increase Earnings	% Increase Stock Price	% Increase EPS
All Years	-2.90	8.30	-2.60	16.5
First Year	-6.29	-11.86	1.57	-13.00
Last Year	-0.43	-101.90	5.67	-98.67

Administration Backgrounds

CEOs that have an administrative background performed well in earnings per share and earnings compared to their industry counter parts and also slightly better in sales and stock price appreciation. Table G shows a stable performance in their last

Table G

CEO's with an Admin. Path (9)	% Increase Sales	% Increase Earnings	% Increase Stock Price	% Increase EPS
All Years	1.56	35.89	2.11	49.67
First Year	3.25	-22.25	2.50	17.00
Last Year	-3.50	2.89	-1.75	-0.25

year and a unique pattern in their first year of a lower earnings growth combined with higher EPS growth. The administrative group had the best performance based on an average of the measures chosen. This was also a very big surprise given that administration backgrounds are not the traditional breeding grounds for chief executive officers.

Sales Backgrounds

Surprisingly, CEOs with a sales background have lower sales growth than their industry counterparts. Table H also shows that they lag in all of the other performance measures also, which makes them the worst overall performers. In their first year they fall way behind in earnings and EPS growth, but out perform their colleagues in stock

Table H

CEO's with a Sales Path (7)	% Increase Sales	% Increase Earnings	% Increase Stock Price	% Increase EPS
All Years	-3.29	-17.29	-3.71	-24.57
First Year	2.00	-206.21	28.03	-176.02
Last Year	-5.54	-44.04	-11.83	-88.17

appreciation. Their last year is even worse than their average performance.

Legal Backgrounds

Finally, Table I shows the results of the smallest group of CEOs, those who came up through the legal department. These CEOs had positive growth in all four categories compared to the industry. Interestingly, they kept this high performance in both their first year and their last year in office which helped them to become one of the

Table I

CEO's with a Legal Path (5)	% Increase Sales	% Increase Earnings	% Increase Stock Price	% Increase EPS
All Years	2.60	15.6	0.60	7.80
First Year	11.00	22.00	2.06	19.03
Last Year	-1.02	78.50	0.25	109.25

best performing groups in the study.

Undergraduate Degrees:

Does it matter what you study or if you study in college? The answer to this question based on this study is yes and no or more specifically:

- Education is important! The CEOs that did not get an undergraduate, underperformed their industry counterparts in every category.
- It doesn't matter if you study Arts or Science; the performance was fairly similar to each other and to the industry average in general.

Bachelor of Science Degrees

Two thirds of the CEOs received a bachelor of science degree or its equivalent yet they performed no better than either their industry counterparts or even CEOs with a bachelor of arts degree. Table J shows only EPS was worse during their tenure and that earnings and EPS was much better in their first year than it was in their last year.

Table J

CEO's with a BS Degree (84)	% Increase Sales	% Increase Earnings	% Increase Stock Price	% Increase EPS
All Years	0.04	-0.96	-0.05	-7.99
First Year	-2.14	6.78	-1.26	13.11
Last Year	-1.84	-88.13	1.95	-89.72

The stock price followed the opposite trend and was slightly better than Arts degree CEOs even though their earnings and EPS was better.

Bachelor of Arts Degree

Compared to the industry averages, CEOs with an arts degree performed slightly better in terms of earnings and EPS but did not perform as well in terms of stock price appreciation. As can be seen in Table K, their last year in office tended to be a bit more stable than their first.

Table K

CEO's with an AB or BA Degree (42)	% Increase Sales	% Increase Earnings	% Increase Stock Price	% Increase EPS
All Years	1.24	8.20	-0.50	6.76
First Year	-1.47	102.9	-5.58	66.59
Last Year	0.24	13.24	0.64	17.44

No Degrees

Below in Table L, one can see the performance of non-degree CEOs in all four categories trails both the industry and the CEOs with undergraduate degrees. There are no first year performance figures because all four of the CEOs started before 1982.

Table L

CEO's with no Degrees (4)	% Increase Sales	% Increase Earnings	% Increase Stock Price	% Increase EPS
All Years	-4.75	-30.75	-2.00	-31.02
Last Year	-9.33	-24.67	-22.67	-96.33

The CEO's last year of performance was even worse than his average tenure which could be one explanation of why it was his last year. This is a small sample but the trend is clear.

Graduate Degrees:

Roughly half of the CEOs in this study went on to get graduate degrees. In turns out that what you study is more important than if you studied in terms of aggregate performance versus the industry for these 130 CEOs. Specifically:

- There was no clear performance difference between CEOs with an advanced degree and those who did not get an advanced degree. They both also performed similarly to the industry averages.
- PHD degrees performed the best while MS degrees were the worst in earnings and EPS and MBAs were the worst in terms of stock appreciation.

The ranking of results by graduate degree are listed below. Again, the bar with the "plus" sign separates the degrees that outperformed the industry average from those that did not.

Rank	Sales	Earnings	Stock	EPS
1	MBA	PHD	PHD	JD
2	<u>JD +</u>	JD	MS	MBA
3	MS	<u>MBA +</u>	<u>JD +</u>	PHD +
4	PHD	MS	MBA	MS

Tables M and N show the performance results for the CEOs broken down by if they

Table M

CEO's with Advanced Degrees (69)	% Increase Sales	% Increase Earnings	% Increase Stock Price	% Increase EPS
All Years	-0.40	-2.31	0.49	-5.71
First Year	-3.51	10.00	-1.89	0.37
Last Year	-2.36	-85.82	-1.37	-90.57

obtained a graduate degree. No advanced degree CEOs performed slightly better in sales, earnings and EPS but not in stock appreciation for both their first year and their tenure average. They also performed better during their last year in all categories. The level of performance difference is not large and is close to the industry averages.

There were several CEOs who had a graduate degree that was not common.

Table N

CEO's with No Advanced Degree (61)	% Increase Sales	% Increase Earnings	% Increase Stock Price	% Increase EPS
All Years	1.04	4.99	-1.10	-1.91
First Year	0.17	67.62	-3.32	66.69
Last Year	-0.44	-12.73	2.43	-12.84

They were included in the aggregate graduate degree performance numbers above but are not listed individually because of the lack of data

MBA Degrees

Table O shows the performance results of CEOs with MBA degrees which

Table O

CEO's with MBA Degrees (28)	% Increase Sales	% Increase Earnings	% Increase Stock Price	% Increase EPS
All Years	1.64	0.04	-1.32	5.21
First Year	-4.38	-15.16	-11.25	-6.81
Last Year	-1.59	-11.28	10.5	-33.5

was the most common graduate degree, but only 22% of the total CEOs that were studied. These CEOs had higher EPS appreciation than the industry average but was the only graduate group with a lower stock appreciation than the average. Finally, their first years were in general very bad in all performance categories while their last year stock appreciation was the highest.

MS Degrees

Below in Table P we see that CEOs with a Master in Science degree perform

very poorly in their last year. In their first year and during their tenure they did not perform well in all of the categories except stock appreciation. EPS during their tenure

Table P

CEO's with MS Degrees (20)	% Increase Sales	% Increase Earnings	% Increase Stock Price	% Increase EPS
All Years	-0.91	-11.45	1.10	-26.35
First Year	-0.84	-25.60	4.30	-19.7
Last Year	-3.12	-201.3	-12.54	-204.64

was significantly below the industry averages.

CEOs with doctorate degrees increased earnings and stock relative to the industry and decreased sales. Table Q shows that this trend was even more dramatic

Table Q

CEO's with PHD Degrees (10)	% Increase Sales	% Increase Earnings	% Increase Stock Price	% Increase EPS
All Years	-6.80	5.80	3.90	0.50
First Year	-8.35	83.6	5.00	0
Last Year	-5.00	8.00	-0.67	26

during their first year. EPS in their last year increased relative to the industry while stock appreciation was slightly negative.

JD Degrees

CEOs with legal degrees performed well but not quite as well as the CEOs who proceeded through the legal departments and had a legal function background. This

was due to the fact that two CEOs with legal degrees did not proceed through the legal department and were not included in that sample. Those two CEOs performed slightly worse than the CEOs who stayed in the legal department. Table R shows that sales

Table R

CEO's with JD Degrees (7)	% Increase Sales	% Increase Earnings	% Increase Stock Price	% Increase EPS
All Years	0.57	5.14	0.14	6.14
First Year	0.67	-3.67	1.33	17.67
Last Year	-1.00	78.50	0.25	109.25

and stock appreciation were fairly similar to those of the CEOs counterparts while earnings and EPS increased at a slightly larger rate. Finally, a large increase in earnings and EPS in the final year was not recognized as significant by the market.

Tests for Statistical Significance:

The first test of statistical significance comes from ranking the CEOs in order of performance (the weighted combination of the four measures). Since there are 130 CEOs, the expected mean rank from a particular group of them should be 65.5 if their performances are distributed randomly. The standard deviation of their ranks should be the square root of $(130 - 1)^2 / 12$ or 37.2. The standard deviation of the difference between the average rank and 65.5 is the square root of $37.2/n$ where n is the number of numbers in the group. Next if we define a $Z = (x - 65.5) / \text{std dev.}$ for each group, we can approximate a Chi squared test.

Under the "equal performance" hypothesis, the sum of the Z^2 should be approximately Chi-squared with eight degrees of freedom. The actual value of 9.8 is consistent with this hypothesis. The sum of the Z_i squared is 9.8 which is less than the

approximated Chi Squared value of sigma w or 13.2. This could be a result of the

Functional Group	Xi	n	Std Dev.i	Zi	Zi^2
Administration	47.7	9	37.4	-1.4	2.0
Finance	79.3	26	42.5	1.7	2.8
General	58.1	10	30.9	-0.8	0.6
Legal	46.8	5	30.0	-1.4	1.9
Marketing	56.6	17	29.9	-1.2	1.5
Operations	65.9	15	33.8	0.0	0.0
Sales	79.4	7	37.7	1.0	1.0
Technical	65.9	41	36.4	0.1	0.0

small sample sizes. The results of this test indicate that the fluctuations in performance might have occurred by chance. This does not mean however, that the results were caused by chance. Further analysis with larger sample sizes could lead to more significant and conclusive findings.

The second test for significance addresses whether there was a relationship between the functional backgrounds of the CEOs and their educational background. Looking at this was difficult because both types of undergraduate degrees had similar performance. Additionally, whether a CEO had a graduate degree or not did not effect performance. One test that was able to be performed however was splitting both functional backgrounds into the higher performers and lower performers and the graduate degrees into both higher performers and lower performers. If one factor was more influential, one would expect a larger difference in performance to be seen in either the background or the education(the stronger variable), regardless of the other variable.

A matrix of the actual performance results is shown below in Table S. From these results it is difficult to say which is the more important factor. Based on performance, a clear difference can be seen in background regardless of education

indicating that background is more important than education. When one looks at the ranking however, the difference education seems to be compensated by the functional background. The functional background might be a little more influential than education, but the difference is not large.

Table S

	High Performance Education	Low Performance Education
High Performance Background	Sample Size : 9 Ave. Performance : 5.3 Ave. Ranking : 47.3	Sample Size : 22 Ave. Performance : 5.2 Ave. Ranking : 60.8
Low Performance Background	Sample Size : 11 Ave. Performance: 1.7 Ave. Ranking : 60.7	Sample Size : 30 Ave. Performance : -8.4 Ave. Ranking : 73.6

CONCLUSION

This study contains over 2500 factual performance measures from 68 companies over ten years with 130 different chief executive officers. With all of this data I can not prove any causation; rather I can point out that in the past there have been some performance differences between similar companies that were run by CEOs with different backgrounds. The causes of the performance differences are too complex and subjective to completely model accurately. However a general relationship exists in some cases and does not exist in others.

Does education matter? It depends on the individual. In the Fortune 50 companies of this study during the 1980s, those CEOs with a college degree outperformed those CEOs who did not have a degree. The type of undergraduate degree did not appear to be a factor with similar performances be CEOs with bachelors of arts degrees and CEOs with bachelors of science degrees.

Does a graduate education matter? Again it depends on the individual. This study shows that those CEOs in this study perform differently not based on whether they have a graduate degree but what type of graduate training they pursued. CEOs that received legal and doctoral degrees performed better than the CEOs with MBAs and master of science degrees.. CEOs with graduate degrees performed as well as those CEOs without graduate degrees in aggregate. When tested for significance, the expected outcome of CEOs in high performance categories and lower performance categories matched the actual outcome. This leads me to believe that both background and education are important with neither one being the sole driver of performance.

Does the functional background of the CEO matter? One last time, nobody really knows for sure but in the firms in this study, CEOs with a legal, marketing or

administrative background on average will outperform CEOs with a finance or sales background in independent performance measures and using the weighting system I outlined earlier. The much hailed generalist did not perform any better than average. When tested for significance, the small sample sizes led to results that indicate the fluctuations in performance may have resulted by chance. They do not say that they were caused by chance. The second test indicates that both educational background and performance are influencers of performance.

While this paper does not prove that the functional background causes the resulting performance, it does raise some interesting points that could be studied further. Additional performance measures could be studied such as customer satisfaction or return on investment. The amount of influence of the CEO could be quantified and included in the study. A very "hands off" CEO affects the company's performance differently than the parochial CEO who still makes all critical decisions. The chief operating officer's background could also be included in an expanded study. This opens up the possibility of looking at the combined background of the top two corporate officers. These are just some of the possible directions future research can go.

EXHIBITS

- Exhibit 1 - Companies in the Study
- Exhibit 2 - Chief Executive Officers, their Tenure and Functional Background
- Exhibit 3 - Chief Executive Officers and their Degrees
- Exhibit 4 - Company Performance by Year

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Exhibit 1

EXHIBIT 1

<u>1992 Rank</u>	<u>Company Name</u>
46	Aluminum Company of America
36	Allied Signal
14	Amoco
42	Anheuser Busch
23	Atlantic Richfield
115	Bethlehem Steel
12	Boeing
67	Borden
40	Bristol Myers Squibb
45	Caterpillar
10	Chevron
11	Chrysler
49	Coastal
37	Coca Cola
19	Conagra
28	Digital Equipment
20	Dow Chemical
8	Dupont
18	Eastman Kodak
2	Exxon
3	Ford Motor
50	General Dynamics
5	General Electric
Acquired	General Foods
1	General Motors
38	Georgia Pacific
41	Goodyear
Acquired	Gulf Oil
26	Hewlett Packard
83	Honeywell
4	IBM
Performance	International Harvester
31	International Paper

<u>1992 Rank</u>	<u>Company Name</u>
Survey Change	ITT
34	Johnson & Johnson
Acquired	Kraft
99	Litton Industries
7	Lockheed
87	LTV
21	McDonnell Douglas
29	MMM
6	Mobil
53	Monsanto
39	Motorola
Acquired	Nabisco
43	Occidental
17	Pepsico
7	Phillip Morris
32	Phillips Petroleum
13	Procter & Gamble
Acquired	RCA
25	RJR Nabisco
35	Rockwell International
33	Sara Lee
15	Shell Oil
Acquired	Signal Companies
Acquired	Squibb
44	Sun Oil Company
Performance	Swift International
27	Tenneco
9	Texaco
66	Union Carbide
16	United Technologies
48	Unocal
24	USX
30	Westinghouse
73	W.R. Grace
22	Xerox

Table 1. Summary of the 100 most cited articles in the field of organizational behavior.

Rank	Author(s)	Year	Citations
1	Robbins, P.	1977	100
2	Robbins, P.	1977	95
3	Robbins, P.	1977	90
4	Robbins, P.	1977	85
5	Robbins, P.	1977	80
6	Robbins, P.	1977	75
7	Robbins, P.	1977	70
8	Robbins, P.	1977	65
9	Robbins, P.	1977	60
10	Robbins, P.	1977	55
11	Robbins, P.	1977	50
12	Robbins, P.	1977	45
13	Robbins, P.	1977	40
14	Robbins, P.	1977	35
15	Robbins, P.	1977	30
16	Robbins, P.	1977	25
17	Robbins, P.	1977	20
18	Robbins, P.	1977	15
19	Robbins, P.	1977	10
20	Robbins, P.	1977	5
21	Robbins, P.	1977	5
22	Robbins, P.	1977	5
23	Robbins, P.	1977	5
24	Robbins, P.	1977	5
25	Robbins, P.	1977	5
26	Robbins, P.	1977	5
27	Robbins, P.	1977	5
28	Robbins, P.	1977	5
29	Robbins, P.	1977	5
30	Robbins, P.	1977	5
31	Robbins, P.	1977	5
32	Robbins, P.	1977	5
33	Robbins, P.	1977	5
34	Robbins, P.	1977	5
35	Robbins, P.	1977	5
36	Robbins, P.	1977	5
37	Robbins, P.	1977	5
38	Robbins, P.	1977	5
39	Robbins, P.	1977	5
40	Robbins, P.	1977	5
41	Robbins, P.	1977	5
42	Robbins, P.	1977	5
43	Robbins, P.	1977	5
44	Robbins, P.	1977	5
45	Robbins, P.	1977	5
46	Robbins, P.	1977	5
47	Robbins, P.	1977	5
48	Robbins, P.	1977	5
49	Robbins, P.	1977	5
50	Robbins, P.	1977	5
51	Robbins, P.	1977	5
52	Robbins, P.	1977	5
53	Robbins, P.	1977	5
54	Robbins, P.	1977	5
55	Robbins, P.	1977	5
56	Robbins, P.	1977	5
57	Robbins, P.	1977	5
58	Robbins, P.	1977	5
59	Robbins, P.	1977	5
60	Robbins, P.	1977	5
61	Robbins, P.	1977	5
62	Robbins, P.	1977	5
63	Robbins, P.	1977	5
64	Robbins, P.	1977	5
65	Robbins, P.	1977	5
66	Robbins, P.	1977	5
67	Robbins, P.	1977	5
68	Robbins, P.	1977	5
69	Robbins, P.	1977	5
70	Robbins, P.	1977	5
71	Robbins, P.	1977	5
72	Robbins, P.	1977	5
73	Robbins, P.	1977	5
74	Robbins, P.	1977	5
75	Robbins, P.	1977	5
76	Robbins, P.	1977	5
77	Robbins, P.	1977	5
78	Robbins, P.	1977	5
79	Robbins, P.	1977	5
80	Robbins, P.	1977	5
81	Robbins, P.	1977	5
82	Robbins, P.	1977	5
83	Robbins, P.	1977	5
84	Robbins, P.	1977	5
85	Robbins, P.	1977	5
86	Robbins, P.	1977	5
87	Robbins, P.	1977	5
88	Robbins, P.	1977	5
89	Robbins, P.	1977	5
90	Robbins, P.	1977	5
91	Robbins, P.	1977	5
92	Robbins, P.	1977	5
93	Robbins, P.	1977	5
94	Robbins, P.	1977	5
95	Robbins, P.	1977	5
96	Robbins, P.	1977	5
97	Robbins, P.	1977	5
98	Robbins, P.	1977	5
99	Robbins, P.	1977	5
100	Robbins, P.	1977	5

Exhibit 2

EXHIBIT 2 - CHIEF EXECUTIVE OFFICERS

<u>Company Name</u>	<u>CEO</u>	<u>Tenure</u>	<u>Background</u>
General Foods	James Ferguson	1982-1985	Marketing
Gulf Oil	J. Lee	1982 - 1984	Operations
International Harvester	Donald Lennox James Cotting	1982-1986 1987 - 1991	Operations Finance
ITT	Rand Araskog	1982-1991	General
Kraft	John Richman	1982-1988	Legal
Nabisco	Bob Schaeberle Ross Johnson	1981-1983 1984-1985	Finance General
RCA	Thorton Bradshaw	1982 -1985	Administration
Signal	Forest Shumway	1982-1985	Legal
Squibb	Richard Furlaud	1982 - 1989	Legal
Swift	John Copeland	1982-1985	Operations
General Motors	Roger Smith Robert Stempel	1982 - 1990 1991	Finance Technical
Exxon	C.C. Garvin Lawrence Rawl	1982 -1986 1987-1991	Technical General
Ford Motor	P. Caldwell Donald Peterson Harold Poling	1982 -1985 1986 - 1989 1990 - 1991	General Administration Finance
IBM	J.R. Opel John Akers	1982 - 1985 1986 - 1991	Sales Marketing
General Electric	Jack Welch	1982-1991	Technical
Mobil	Raliegh Warner Allen Murray	1982 -1985 1986-1991	Finance Finance

EXHIBIT 2 - CHIEF EXECUTIVE OFFICERS (continued)

Company Name	CEO	Tenure	Background
Phillip Morris	George Weissman	1982 -1983	Marketing
	Hamish Maxwell	1984-1991	Marketing
Dupont	Edward Jefferson	1982 -1985	Technical
	Richard Heckert	1986 -1988	Technical
	Edgar Woolard	1989 - 1991	Operations
Texaco	John McKinley	1982 -1986	Technical
	J. W. Kinnear	1987-1991	Sales
Chevron	G. M. Keller	1982 -1988	Technical
	Kenneth Derr	1989-1991	Technical
Chrysler	Lee Iacocca	1982-1991	Marketing
Boeing	TA Wilson	1982 - 1985	Technical
	Frank Shrontz	1986 - 1991	Legal
Procter & Gamble	John Smale	1982-1989	Marketing
	Ed Artzt	1990-1991	Marketing
Amoco	John Swearingen	1982	Operations
	Richard Morrow	1983 - 1989	Technical
	Larry Fuller	1990 - 1991	General
Shell	John Bookout	1982 -1985	Technical
	LC van Wacheim	1986-1991	Technical
United Technologies	Harry Gray	1982 -1985	Admin.
	Robert Daniell	1986 - 1991	General
Pepsico	Don Kendall	1982 -1985	Marketing
	Wayne Calloway	1986 -1991	Finance
Eastman Kodak	Walter Fallon	1982	Operations
	Colby Chandler	1983 - 1989	Technical
	Kay Whitmore	1990 - 1991	Technical
Conagra	C. M. Harper	1982-1991	Technical

EXHIBIT 2 - CHIEF EXECUTIVE OFFICERS (continued)

Company Name	CEO	Tenure	Background
Dow Chemical	Paul Orefice	1982-1987	Finance
	Frank Popoff	1988-1991	Marketing
McDonnell Douglas	Stanford McDonnell	1982 -1987	Technical
	John McDonnell	1988-1991	Finance
Xerox	D.T. Kearns	1982 -1989	Sales
	Paul Allaire	1990 - 1991	Finance
Atlantic Richfield	William Kieschnick	1982 -1985	Technical
	Lodrick Cook	1986-1991	Operations
USX	David Roderick	1982 - 1988	Finance
	Charles Corry	1989 - 1991	Finance
RJR Nabisco	Paul Sticht	1982	Marketing
	Tylie Wilson	1983-1986	Administration
	Ross Johnson	1987-1988	General
	Louis Gerstner	1989-1991	Finance
Hewlett Packard	John Young	1982-1991	Finance
Tenneco	J. Ketelsen	1982-1991	Finance
Digital Equipment	Ken Olsen	1982-1991	Technical
MMM	Lewis Lehr	1982 -1985	Technical
	A. Jacobson	1986-1991	Operations
Westinghouse	R. Kirby	1982 -1983	Technical
	D. Danforth	1984-1987	Operations
	John Marous	1988-1989	Technical
	Paul Lego	1990 -1991	Finance
International Paper	Edwin Gee	1982 -1983	Technical
	John Georges	1984-1991	Technical
Phillips Petroleum	William Douce	1982 -1985	Operations
	CJ Silas	1986-1991	Operations

EXHIBIT 2 - CHIEF EXECUTIVE OFFICERS (continued)

Company Name	CEO	Tenure	Background
Sara Lee	John Bryan	1982-1991	Administration
Johnson & Johnson	James Burke Ralph Larsen	1982-1988 1989-1991	Marketing Operations
Rockwell International	Robert Andersen D. R. Beall	1982 -1987 1988-1991	Technical Finance
Allied Signal	Edward Hennessey	1982 - 1991	Finance
Coca Cola	Roberto Goizueta	1982 -1991	Technical
Georgia Pacific	Robert Flowerree T Marshall Hahn	1982 1983 -1991	Operations Technical
Motorola	Robert Galvin William Weisz George Fisher	1982 -1986 1987 1988-1991	Administration Technical Technical
Bristol Myers Squibb	Richard Gelb	1982 - 1991	Marketing
Goodyear	Charles Pilliod R. E. Mercer Tom Barrett	1982 - 1983 1984 - 1988 1989-1991	Sales Administration Technical
Anheuser Busch	August Busch III	1982 -1991	Marketing
Occidental	Armand Hammer Ray Irani	1982 -1990 1991	Finance Technical
Sun	Theodore Burtis R. McClements	1982-1985 1986-1991	Technical Technical
Caterpillar	Lee Morgan George Schaefer	1982-1985 1986-1991	Marketing Finance
Alcoa	Krome George Charles Parry Paul O'Neil	1982 1983-1987 1988 - 1991	Technical Operations Finance

EXHIBIT 2 - CHIEF EXECUTIVE OFFICERS (continued)

Company Name	CEO	Tenure	Background
Lockheed	R. A. Anderson	1982 - 1986	Finance
	Lawrence Kitchen	1987-1988	Finance
	Daniell Tellep	1989 - 1991	Technical
Unocal	Fred Hartley	1982 -1987	Technical
	Richard Stegemeir	1988-1991	Technical
Coastal	OS Wyatt	1982 -1988	Technical
	James Paul	1989 - 1991	Finance
General Dynamics	David Lewis	1982-1985	Administration
	Stanley Pace	1986-1990	General
	William Anders	1991	Operations
Monsanto	John Hanley	1982-1983	Marketing
	Richard Mahoney	1984 -1991	Marketing
Union Carbide	Warren Andersen	1982 -1986	Legal
	Robert Kennedy	1987 - 1991	Operations
Borden	Eugene Sullivan	1982 -1985	Sales
	RJ Ventres	1986-1991	Technical
W.R. Grace	JP Grace	1982-1991	Finance
Honeywell	Edson Spencer	1982-1986	Sales
	James Renier	1987-1991	Technical
LTV	Paul Thayer	1982	Sales
	R.A. Hayes	1983-1990	Administration
	David Hoag	1991	Marketing
Litton	Fred O' Green	1982-1985	Technical
	Orion Hoch	1986-1991	Technical
Bethlehem Steel	Donald Trautlien	1982 -1985	Finance
	Walter Williams	1986 - 1991	Technical

EXHIBIT 3 - CHIEF EXECUTIVE OFFICER'S EDUCATION

<u>Company Name</u>	<u>CEO</u>	<u>Degree</u>	<u>Advanced Degree</u>
General Foods	James Ferguson	AB	MBA
Gulf Oil	J. Lee	BA (chem)	MA (chem)
International Harvester	Donald Lennox James Cotting	BS BA	
ITT	Rand Araskog	BSME	
Kraft	John Richman	BA	JD
Nabisco	Bob Schaeberle Ross Johnson	AB BA (Com)	MBA
RCA	Thorton Bradshaw	AB	MBA
Signal	Forest Shumway	AB	JD
Squibb	Richard Furlaud	AB	JD
Swift	John Copeland	BS	
General Motors	Roger Smith Robert Stempel	BBA BSME	MBA PHD
Exxon	C.C. Garvin Lawrence Rawl	BS (Chem) BS	MS
Ford Motor	P. Caldwell Donald Peterson Harold Poling	BA (econ) BSME BA	MBA MBA MBA
IBM	J.R. Opel John Akers	AB BS	MBA
General Electric	Jack Welch	BS (ChemE)	PHD
Mobil	Raliegh Warner Allen Murray	AB BS (Bus)	

EXHIBIT 3 - CHIEF EXECUTIVE OFFICER'S EDUCATION (continued)

<u>Company Name</u>	<u>CEO</u>	<u>Degree</u>	<u>Advanced Degree</u>
Phillip Morris	George Weissman	BA (Bus)	
	Hamish Maxwell	BA	
Dupont	Edward Jefferson	BSE	
	Richard Heckert	BA	PHD
	Edgar Woolard	BSE	
Texaco	John McKinley	BS (ChemE)	MS
	J. W. Kinnear	BS	
Chevron	G. M. Keller	BS (ChemE)	
	Kenneth Derr	BSME	MBA
Chrysler	Lee Iacocca	BSME	MS
Boeing	TA Wilson	BS	MS, MBA
	Frank Shrontz	LLB	MBA, JD
Procter & Gamble	John Smale	BS	
	Ed Artzt	BS	
Amoco	John Swearingen	BS	MS, LLD
	Richard Morrow	BSME	
	Larry Fuller	BSCE	JD
Shell	John Bookout	BS	MA
	LC van Wacheim	BS	
United Technologies	Harry Gray	BS	MS
	Robert Daniell	AS	
Pepsico	Don Kendall	LLD	
	Wayne Calloway	BBA	
Eastman Kodak	Walter Fallon	BS	
	Colby Chandler	BS	MS
	Kay Whitmore	BSE	MS
Conagra	C. M. Harper	BSME	MBA

EXHIBIT 3 - CHIEF EXECUTIVE OFFICER'S EDUCATION (continued)

Company Name	CEO	Degree	Advanced Degree
Dow Chemical	Paul Oreffice	BS (ChemE)	
	Frank Popoff	BS	MBA
McDonnell Douglas	Stanford McDonnell	BSE	MS
	John McDonnell	BS	MS
Xerox	D.T. Kearns	BS	
	Paul Allaire	BSEE	MBA
Atlantic Richfield	William Kieschnick	BS	
	Lodrick Cook	BSE	MBA
USX	David Roderick	BA (Econ)	
	Charles Corry	BA	JD
RJR Nabisco	Paul Sticht	BA	
	Tylie Wilson	AB	
	Ross Johnson	BA (Com)	MBA
	Louis Gerstner	BA	MBA
Hewlett Packard	John Young	BSCE	MBA
Tenneco	J. Ketelsen	BS	
Digital Equipment	Ken Olsen	BSEE	MS
MMM	Lewis Lehr	BS (ChemE)	
	A. Jacobson	BS (ChemE)	
Westinghouse	R. Kirby	BS	MBA
	D. Danforth	BSME	
	John Marous	BS	MS
	Paul Lego	BSEE	MS
International Paper	Edwin Gee	BS	PHD
	John Georges	BS	MBA
Phillips Petroleum	William Douce	BS	
	CJ Silas	BS (ChemE)	

EXHIBIT 3 - CHIEF EXECUTIVE OFFICER'S EDUCATION (continued)

Company Name	CEO	Degree	Advanced Degree
Sara Lee	John Bryan	BA (Econ)	
Johnson & Johnson	James Burke Ralph Larsen	BS (Econ) BBA	MBA
Rockwell International	Robert Andersen D. R. Beall	BSME BS	MS MBA
Allied Signal	Edward Hennessey	BA	
Coca Cola	Roberto Goizueta	BS (ChemE)	
Georgia Pacific	Robert Flowerree T Marshall Hahn	BA BS	PHD
Motorola	Robert Galvin William Weisz George Fisher	- BSEE BSE	PHD
Bristol Myers Squibb	Richard Gelb	BA	MBA
Goodyear	Charles Pilliod R. E. Mercer Tom Barrett	- AB BS (ChemE)	MBA
Anheuser Busch	August Busch III	-	
Occidental	Armand Hammer Ray Irani	BS BSC	MD PHD
Sun	Theodore Burtis R. McClements	BS BSC	PHD
Caterpillar	Lee Morgan George Schaefer	BS BS	MS
Alcoa	Krome George Charles Parry Paul O'Neil	BA (Bus) BSEE BA	MPA

EXHIBIT 3 - CHIEF EXECUTIVE OFFICER'S EDUCATION (continued)

Company Name	CEO	Degree	Advanced Degree
Lockheed	R. A. Anderson	AB	MBA
	Lawrence Kitchen	BSE	
	Daniell Tellep	BSME	MSEE
Unocal	Fred Hartley	BS (ChemE)	
	Richard Stegemeir	BSE	MSE
Coastal	OS Wyatt	BSME	
	James Paul	BS	
General Dynamics	David Lewis	BS	
	Stanley Pace	BSE	MS
	William Anders	BSEE	MS
Monsanto	John Hanley	BS	MBA
	Richard Mahoney	BS (ChemE)	LLD
Union Carbide	Warren Andersen	AB	JD
	Robert Kennedy	BSME	MBA
Borden	Eugene Sullivan	BS	MBA
	RJ Ventres	BS (ChemE)	
W.R. Grace	JP Grace	BA	
Honeywell	Edson Spencer	BSC	
	James Renier	BS	PHD
LTV	Paul Thayer	-	
	R.A. Hayes	BA (Econ)	MBA
	David Hoag	BA	
Litton	Fred O' Green	BSE	MSEE
	Orion Hoch	BS	PHD
Bethlehem Steel	Donald Trautlien	BSE	
	Walter Williams	BS (ChemE)	

2021 2022

Financial Performance Report

Category	2021	2022	2023	2024	2025
Revenue	100	105	110	115	120
Expenses	80	85	90	95	100
Profit	20	20	20	20	20
Assets	50	55	60	65	70
Liabilities	30	35	40	45	50
Equity	20	20	20	20	20
Operating Income	15	15	15	15	15
Net Income	10	10	10	10	10
Dividends	5	5	5	5	5
Retained Earnings	15	15	15	15	15
Capital Expenditures	10	10	10	10	10
Debt Repayment	5	5	5	5	5
Share Repurchases	5	5	5	5	5
Free Cash Flow	10	10	10	10	10
Operating Cash Flow	15	15	15	15	15
Investing Cash Flow	-5	-5	-5	-5	-5
Financing Cash Flow	0	0	0	0	0
Change in Cash	10	10	10	10	10
Free Cash Flow Yield	10%	10%	10%	10%	10%
Operating Margin	15%	15%	15%	15%	15%
Net Income Margin	10%	10%	10%	10%	10%
Return on Assets	20%	20%	20%	20%	20%
Return on Equity	50%	50%	50%	50%	50%
Debt to Equity Ratio	1.5	1.5	1.5	1.5	1.5
Current Ratio	1.5	1.5	1.5	1.5	1.5
Interest Coverage Ratio	2.0	2.0	2.0	2.0	2.0
Dividend Payout Ratio	50%	50%	50%	50%	50%
Share Repurchase Ratio	50%	50%	50%	50%	50%
Capital Expenditure Ratio	10%	10%	10%	10%	10%
Debt Repayment Ratio	50%	50%	50%	50%	50%
Share Repurchase Ratio	50%	50%	50%	50%	50%
Free Cash Flow Yield	10%	10%	10%	10%	10%
Operating Margin	15%	15%	15%	15%	15%
Net Income Margin	10%	10%	10%	10%	10%
Return on Assets	20%	20%	20%	20%	20%
Return on Equity	50%	50%	50%	50%	50%
Debt to Equity Ratio	1.5	1.5	1.5	1.5	1.5
Current Ratio	1.5	1.5	1.5	1.5	1.5
Interest Coverage Ratio	2.0	2.0	2.0	2.0	2.0
Dividend Payout Ratio	50%	50%	50%	50%	50%
Share Repurchase Ratio	50%	50%	50%	50%	50%
Capital Expenditure Ratio	10%	10%	10%	10%	10%
Debt Repayment Ratio	50%	50%	50%	50%	50%
Share Repurchase Ratio	50%	50%	50%	50%	50%
Free Cash Flow Yield	10%	10%	10%	10%	10%

Exhibit 4

EXHIBIT 4

Company Name	1991			
	Sales Difference	Earnings Difference	Stock Difference	EPS Difference
Alcoa	-1.1	-26.8	9	-75.1
Allied Signal	-3.1	-160.1	18	-170.7
Amoco	-1.5	29.6	-1	-15
Anheuser Busch	-5.7	5.6	-5	-2.9
Atlantic Richfi	2	-12.7	-5	-57.9
Bethlehem Steel	-5.4	52	6	4
Boeing	7.2	12.1	-53	2.7
Borden	-10.2	-31.9	-25	-30.7
Bristol Myers S	-3.5	1.6	-1	4.6
Caterpillar	-8.8	-263.4	-3	-290.2
Chevron	1.7	11.9	-1	-33.5
Chrysler	0.1	-1210.1	5	-1191.3
Coastal	8.1	-5.3	-12	-51.2
Coca Cola	3.2	11.1	30	6.1
Conagra	20.7	21.3	14	1.9
Digital Equipme	0.2	-931	-25	-972
Dow Chemical	-4.5	-13.9	-12	-38.2
Dupont	-5.5	-21.3	-4	-44.8
Eastman Kodak	-2	-113.6	-17	-105.7
Exxon	5.5	63.8	18	18.4
Ford Motor	-4.5	-303.5	4	-355.5
General Dynamic	-5.2	-1	105	-11
General Electri	1.1	-29.7	15	-44.5
General Foods	0	0	0	0
General Motors	3.9	59	-10	2
Georgia Pacific	-5	-98.9	14	136.6
Goodyear	-6.6	-13	127	-14
Gulf Oil	0	0	0	0
Hewlett Packard	2.9	1.2	55	-12.3
Honeywell	-15.9	-29.3	8	-14.6
IBM	-13.1	-148	-30	-158.1
International H	-5	-941	-2	-698
International P	2	-27.7	-15	-70.1
ITT	2	6	18	-9

EXHIBIT 4

Company Name	1991			
	Sales Differenc	Earnings Differenc	Stock Differenc	EPS Differenc
Johnson & Johnson	-0.2	11.8	2	14
Kraft	0	0	0	0
Litton	-1.2	-55.5	12	-67.2
Lockheed	-0.7	-9.1	-38	-19.3
LTV	5.2	56.5	-14	17.2
McDonnell Douglas	15.5	37.2	14	27
MMM	-2.6	-27.8	-11	-19
Mobil	4.8	51.5	8	5.6
Monsanto	-2.3	-27.8	-10	-50.9
Motorola	2.2	0	16	-16.5
Nabisco	0	0	0	0
Occidental	-51	62	11	13
Pepsico	3.1	-5.7	-24	-13
Phillip Morris	3.5	-28.1	-7	-27.1
Phillips Petroleum	-1.6	-14.9	-2	-48.6
Procter & Gamble	4.4	23.7	4	0.6
RCA	0	0	0	0
RJR Nabisco	-8	-27	-28	-14
Rockwell Internationa	-5.3	5.2	-11	-6.6
Sara Lee	1.9	0.8	19	0.6
Shell	-1.1	-46.1	16	6
signal	0	0	0	0
Squibb	0	0	0	0
Sun	-6	-217	-2	-264.6
Swift	0	0	0	0
Tenneco	-2.8	-201.5	-16	-236.4
Texaco	-0.9	41.2	4	-5
Union Carbide	-4.6	-91.1	5	-116.5
United Technologies	-1.4	-237	-43	-261.8
Unocal	-0.9	-29.8	-8	-75.9
USX	-3.8	-118.7	-16	6
Westinghouse	-2.9	-496.2	-32	-487.2
W.R. Grace	1.6	25.8	19	-0.1
Xerox	-8	70.8	21	127.5

EXHIBIT 4

Company	1990			
	NSales Differenc	Earnings Differenc	Stock Differenc	EPS Differenc
Johnson &	2	-12	18	-6
Kraft	0	0	0	0
Litton	-3.2	0.1	10	-5
Lockheed	-3.9	993.1	21	992
LTV	1.3	-28.9	-39	-83
McDonnell	4.1	33.1	45	32
MMM	4	13	-9	7
Mobil	-5	-26	0	6
Monsanto	-1.8	-18.1	24	-23
Motorola	6.8	-0.2	-10	-9
Nabisco	0	0	0	0
Occidenta	-4.5	-708.4	-32	-668
Pepsico	2.6	10.2	19	5
Phillip M	6.1	15.9	30	7
Phillips	-8	222	5	143
Procter &	1	16	8	17
RCA	0	0	0	0
RJR Nabis	-18	-89	-42	-111
Rockwell	-8.2	-15.2	28	-19
Sara Lee	-7.9	10.9	-14	-6
Shell	-7	-59	-3	-22
signal	0	0	0	0
Squibb	0	0	0	0
Sun	0	100	-14	134
Swift	0	0	0	0
Tenneco	-5.4	3.2	-17	-4
Texaco	7	-73	5	-42
Union Car	-18.8	-44.1	-2	-55
United Te	5.1	0.1	-10	3
Unocal	-17	21	-9	55
USX	15.3	29.1	-5	-12
Westingho	-5.2	-71.2	-27	-79
W.R. Grac	1.2	-18.1	-11	-28
Xerox	-1	-58	-15	-74

EXHIBIT 4

Company	1990			
	NSales Differenc	Earnings Differenc	Stock Differenc	EPS Differenc
Alcoa	2.3	-24.9	10	-69
Allied Si	-1.9	-19.9	-16	-13.6
Amoco	-3	-14	-5	22
Anheuser	-0.4	0.2	-15	-4
Atlantic	-2	-30	10	9
Bethlehem	4.3	-243.9	-16	-321
Boeing	31.1	35.1	-6	34
Borden	-5.9	95.9	-36	87
Bristol M	0	116	5	121
Caterpill	-4.4	-50.8	1	-60
Chevron	13	726	4	736
Chrysler	-11	-54	2	-86
Coastal	-8	0	-3	20
Coca Cola	0.6	-29.8	-4	-31
Conagra	30.1	12.9	20	2
Digital E	-6.1	-97.6	-3	-103
Dow Chemi	7.2	-42.1	-15	-52
Dupont	7.2	-5.1	4	-11
Eastman K	-2	41	-1	34
Exxon	2	10	12	45
Ford Moto	5	-50	-8	-82
General D	-3.9	-304.9	-36	-306
General E	-0.2	8.8	1	3
General F	0	0	0	0
General M	3	-120	6	-170
Georgia P	22.9	-6	-11	-48
Goodyear	-1	-85	-17	-134
Gulf Oil	0	0	0	0
Hewlett P	2.9	-15.6	1	-23
Honeywell	-9	-29	25	-28
IBM	0.9	55.4	12	53
Internati	-6	-83	23	-155
Internati	11.9	5	12	-39
ITT	-5.4	11.2	17	10

EXHIBIT 4

Company	1989			
	NSales Differenc	Earnings Differenc	Stock Differenc	EPS Differenc
Alcoa	6	0	8	7
Allied Si	-2	27	18	10
Amoco	1	-10	21	-19
Anheuser	-4	-11	-46	-7
Atlantic	-24	35	14	31
Bethlehem	-11	-49	-22	-48
Boeing	17	72	12	53
Borden	-4	-134	-22	-133
Bristol M	48	-30	-5	-61
Caterpill	0	-10	-12	-17
Chevron	3	-74	15	-83
Chrysler	0	-41	-20	-70
Coastal	-8	20	-15	4
Coca Cola	0	47	25	57
Conagra	11	14	33	13
Digital E	2	-9	-15	-30
Dow Chemi	1	4	10	2
Dupont	3	13	15	10
Eastman K	0	-67	-25	-70
Exxon	-5	-21	-5	-28
Ford Moto	3	-3	2	-28
General D	2	-10	-19	-27
General E	3	6	13	7
General F	0	0	0	0
General M	3	12	18	-15
Georgia P	0	47	-1	48
Goodyear	-3	-39	-12	-56
Gulf Oil	0	0	0	0
Hewlett P	11	11	1	-10
Honeywell	-7	95	30	92
IBM	-4	-26	14	-49
Internati	-3	-41	-29	-78
Internati	12	20	2	10
ITT	-3	14	-17	11

EXHIBIT 4

	1989			
Company	NSales	Earnings	Stock	EPS
	Differenc	Differenc	Differenc	Differenc

Johnson &	-1	-9	5	3
Kraft	0	0	0	0
Litton	-3	-3	-33	2
Lockheed	-10	-87	-15	-105
LTV	-24	90	-54	97
McDonnell	-4	-24	-27	-42
MMM	5	3	12	2
Mobil	-8	-1	14	-10
Monsanto	0	15	11	15
Motorola	8	2	41	3
Nabisco	0	0	0	0
Occidenta	-1	-13	-8	-11
Pepsico	9	0	22	1
Phillip M	42	12	-1	14
Phillips	-3	-54	1	-64
Procter &	-5	9	29	9
RCA	0	0	0	0
RJR Nabis	-26	-191	-34	-191
Rockwell	-3	-20	-29	-15
Sara Lee	4	12	-8	11
Shell	-11	25	-12	16
signal	0	0	0	0
Squibb	0	0	0	0
Sun	1	1312	-3	1403
Swift	0	0	0	0
Tenneco	-15	-20	28	-17
Texaco	-17	97	1	74
Union Car	0	-13	-30	-23
United Te	6	20	33	1
Unocal	4	-34	-38	-43
USX	4	18	11	32
Westingho	-6	2	10	3
W.R. Grac	-6	8	-6	2
Xerox	-1	76	-17	79

EXHIBIT 4

Company	1988			
	NSales Differenc	Earnings Differenc	Stock Differenc	EPS Differenc
Johnson &	2	0	4	14
Kraft	0	0	0	0
Litton	-3	2	-8	4
Lockheed	-14	36	-8	61
LTV	-17	-837	-10	-895
McDonnell	7	0	26	17
MMM	0	9	3	53
Mobil	-11	3	3	16
Monsanto	-7	1	-4	29
Motorola	10	26	-15	25
Nabisco	0	0	0	0
Occidenta	18	40	-8	80
Pepsico	4	11	5	-35
Phillip M	8	12	11	31
Phillips	0	1637	20	4383
Procter &	2	186	4	204
RCA	0	0	0	0
RJR Nabis	-9	-2	16	13
Rockwell	-15	9	12	15
Sara Lee	6	7	-3	22
Shell	-4	-62	-8	-49
signal	0	0	0	0
Squibb	10	2	-3	22
Sun	-6	-161	-48	-148
Swift	0	0	0	0
Tenneco	-13	975	5	987
Texaco	-7	937	10	950
Union Car	4	150	20	159
United Te	-3	-1	-6	11
Unocal	0	102	3	114
USX	-2	135	-9	319
Westingho	4	-8	6	-8
W.R. Grac	7	0	-5	18
Xerox	47	-50	2	-9

EXHIBIT 4

Company	1988			
	NSales Differenc	Earnings Differenc	Stock Differenc	EPS Differenc
Alcoa	10	221	21	267
Allied Si	-5	-42	-13	-22
Amoco	0	-11	-1	1
Anheuser	-1	0	-12	-43
Atlantic	3	-34	4	-19
Bethlehem	3	21	0	26
Boeing	3	16	23	29
Borden	4	2	-11	19
Bristol M	1	0	0	13
Caterpill	11	51	-17	60
Chevron	-8	13	9	26
Chrysler	22	-33	-9	-46
Coastal	5	-24	10	-21
Coca Cola	0	-3	10	-46
Conagra	-3	-11	2	7
Digital E	3	2	1	15
Dow Chemi	9	58	-10	79
Dupont	-9	-12	-1	5
Eastman K	16	2	7	45
Exxon	-1	-54	-6	-35
Ford Moto	16	1	2	-4
General D	-6	-25	-20	-13
General E	13	-3	4	-2
General F	0	0	0	0
General M	6	23	8	18
Georgia P	-3	-43	3	-22
Goodyear	-5	-71	1	-73
Gulf Oil	0	0	0	0
Hewlett P	3	14	-7	33
Honeywell	-5	-289	-10	-252
IBM	-9	-3	5	11
Internati	3	786	-9	975
Internati	9	40	-3	44
ITT	-10	-40	11	-24

EXHIBIT 4

Company	1987			
	NSales Differenc	Earnings Differenc	Stock Differenc	EPS Differenc
Alcoa	59	-75	-40	-142
Allied Si	-7	4	-11	29
Amoco	3	82	-7	7
Anheuser	-1	8	-2	47
Atlantic	5	99	3	22
Bethlehem	0	346	184	-177
Boeing	-11	-32	13	-19
Borden	19	0	4	19
Bristol M	0	5	-5	24
Caterpill	-2	319	41	147
Chevron	0	41	-20	-35
Chrysler	9	-8	-6	-22
Coastal	4	58	-14	199
Coca Cola	-21	-13	-6	26
Conagra	41	21	-14	19
Digital E	8	57	-17	42
Dow Chemi	9	40	1	49
Dupont	1	-13	34	-4
Eastman K	5	193	-15	169
Exxon	2	-10	4	-84
Ford Moto	7	41	13	32
General D	-4	696	-6	309
General E	5	0	-3	-27
General F	0	0	0	0
General M	-8	21	-7	8
Georgia P	1	-5	-6	32
Goodyear	-17	469	4	976
Gulf Oil	0	0	0	0
Hewlett P	-2	-2	19	-11
Honeywell	-16	478	11	-80
IBM	-10	-17	-6	-23
Internati	-2	1800	-13	985
Internati	23	-27	6	2
ITT	-2	60	-30	-103

EXHIBIT 4

	1987			
Company	NSales	Earnings	Stock	EPS
	Differenc	Differenc	Differenc	Differenc

Johnson &	2	138	8	165
Kraft	16	-2	-4	21
Litton	-9	77	15	61
Lockheed	6	-1	4	13
LTV	-3	446	-43	22
McDonnell	-1	9	0	22
MMM	0	-4	12	-40
Mobil	7	-11	-9	-87
Monsanto	0	-28	1	-19
Motorola	7	42	0	12
Nabisco	0	0	0	0
Occidenta	8	19	-22	56
Pepsico	15	19	9	55
Phillip M	-3	5	15	23
Phillips	3	-85	19	-169
Procter &	-4	-68	-9	-53
RCA	0	0	0	0
RJR Nabis	-17	-11	-6	32
Rockwell	-8	-13	-17	-34
Sara Lee	4	0	-3	14
Shell	17	39	-1	-76
signal	0	0	0	0
Squibb	-27	-25	-3	-3
Sun	-14	-10	-10	-85
Swift	22	-120	20	-102
Tenneco	-10	658	-12	-308
Texaco	2	-1000	28	-176
Union Car	-23	-82	-19	-83
United Te	5	710	-2	1582
Unocal	6	3	2	-73
USX	-8	946	-25	882
Westingho	-8	-7	6	-28
W.R. Grac	-37	-99	-15	-78
Xerox	0	2	-9	-33

EXHIBIT 4

Company	1986			
	NSales Differenc	Earnings Differenc	Stock Differenc	EPS Differenc
Alcoa	-7	-14	-17	98
Allied Si	20	104	-4	105
Amoco	-8	-16	-12	-20
Anheuser	3	6	11	12
Atlantic	-10	146	0	141
Bethlehem	-12	-19	5	23
Boeing	11	22	2	19
Borden	2	1	5	15
Bristol M	-4	-9	-14	-44
Caterpill	6	-81	-29	-26
Chevron	-17	-8	6	-13
Chrysler	2	-25	10	27
Coastal	17	-4	-19	-36
Coca Cola	0	18	-2	25
Conagra	4	1	-5	10
Digital E	2	12	63	32
Dow Chemi	-6	135	18	1088
Dupont	-10	11	16	-7
Eastman K	0	8	14	35
Exxon	5	56	9	56
Ford Moto	15	20	-7	62
General D	1	-102	-1	-105
General E	18	1	6	9
General F	0	0	0	0
General M	3	-37	-17	-7
Georgia P	-1	39	-8	22
Goodyear	0	-90	52	-86
Gulf Oil	0	0	0	0
Hewlett P	-3	-20	-8	8
Honeywell	-2	-105	-20	-189
IBM	-10	-53	-53	-25
Internati	-13	-119	192	-69
Internati	13	110	7	126
ITT	-40	49	19	107

EXHIBIT 4

Company	1986			
	NSales Differenc	Earnings Differenc	Stock Differenc	EPS Differenc
Johnson &	-4	-66	10	-96
Kraft	6	-18	-20	-35
Litton	-9	-82	-34	-62
Lockheed	-1	6	-4	6
LTV	-8	-139	-89	-12
McDonnell	1	-16	-3	-15
MMM	1	12	10	39
Mobil	5	81	16	76
Monsanto	0	373	-16	456
Motorola	1	163	-8	154
Nabisco	0	0	0	0
Occidenta	8	-105	-11	-54
Pepsico	3	-27	-9	-17
Phillip M	66	4	6	13
Phillips	-13	0	3	3
Procter &	5	-31	-10	-31
RCA	0	0	0	0
RJR Nabis	7	-3	-2	9
Rockwell	2	-3	3	6
Sara Lee	-6	-6	16	7
Shell	8	-1	-47	-8
signal	0	0	0	0
Squibb	11	55	13	24
Sun	-7	19	-14	16
Swift	-9	86	-17	95
Tenneco	-8	-119	10	-164
Texaco	-7	5	-26	0
Union Car	-15	173	11	256
United Te	-10	-73	8	-82
Unocal	-5	0	21	5
USX	-21	-139	112	-102
Westingho	-7	5	-2	29
W.R. Grac	-8	195	-29	255
Xerox	-4	-7	-4	17

EXHIBIT 4

Company	1985			
	NSales Differenc	Earnings Differenc	Stock Differenc	EPS Differenc
Alcoa	-5	-79	14	-103
Allied Si	-34	-163	25	-159
Amoco	3	0	-19	-2
Anheuser	0	1	-28	4
Atlantic	-8	-124	18	-142
Bethlehem	0	-48	15	-46
Boeing	14	-34	-27	-24
Borden	-2	-4	36	12
Bristol M	1	4	-12	23
Caterpill	-1	163	46	198
Chevron	57	12	-6	3
Chrysler	7	-17	-4	70
Coastal	19	50	68	22
Coca Cola	3	2	10	5
Conagra	61	41	28	8
Digital E	12	42	17	43
Dow Chemi	0	-79	50	-58
Dupont	-19	-11	16	10
Eastman K	-2	-75	2	-52
Exxon	-3	0	0	-3
Ford Moto	0	1	37	-3
General D	-11	-5	-8	19
General E	-4	6	-15	31.5
General F	0	-3	-16	-272
General M	14	3	-34	-3
Georgia P	-5	63	7	100
Goodyear	-1	18	18	27
Gulf Oil	0	0	0	0
Hewlett P	0	-20	-7	-13
Honeywell	6	7	-11	31
IBM	1	6	-10	12
Internati	-7	12	-30	-12
Internati	-3	17	-7	49
ITT	-13	-21	1	12

EXHIBIT 4

Company	1985			
	NSales Differenc	Earnings Differenc	Stock Differenc	EPS Differenc
Johnson &	0	10	-15	33
Kraft	-3	-3	-25	14
Litton	-11	0	-10	29
Lockheed	0	11	2	22
LTV	21	-64	-11	-46
McDonnell	0	0	-7	12
MMM	-1	-25	-12	2
Mobil	2	-7	-16	-16
Monsanto	0	-111	18	-92
Motorola	-7	-77	-7	-52
Nabisco	0	0	0	0
Occidenta	-4	42	-17	66
Pepsico	-7	143	17	148
Phillip M	15	37	-7	53
Phillips	3	-37	-54	-16
Procter &	0	-14	5	0
RCA	-2	28	28	49
RJR Nabis	2	-24	-35	-8
Rockwell	17	24	-23	52
Sara Lee	11	5	25	18
Shell	0	4	0	-38
signal	0	0	0	0
Squibb	4	6	27	25
Sun	-3	9	-16	3
Swift	-7	-109	-39	-98
Tenneco	0	-59	-17	-33
Texaco	0	311	45	402
Union Car	-6	5	-87	-248
United Te	-22	-57	12	-49
Unocal	1	-42	-20	-39
USX	16	10	-18	-23
Westingho	-1	17	26	45
W.R. Grac	7	-14	4	2
Xerox	-2	52	22	85

EXHIBIT 4

Company Name	1984			
	Sales Differenc	Earnings Differenc	Stock Differenc	EPS Differenc
Alcoa	0	-944	7	-946
Allied Signal	3	-26	-27	-48
Amoco	-5	19	15	18
Anheuser Busch	0	18	14	13
Atlantic Richfi	-4	-27	5	-29
Bethlehem Steel	1	-800	-20	-870
Boeing	-18	741	25	86
Borden	-4	-14	9	-9
Bristol Myers S	2	10	17	9
Caterpillar	8	-183	-23	-1035
Chevron	-3	-2	-7	-6
Chrysler	28	156	19	45
Coastal	1	9	-12	10
Coca Cola	0	19	1	15
Conagra	83	25	-30	-33
Digital Equipme	13	66	-56	39
Dow Chemical	-1	53	1	66
Dupont	-3	-7	6	5
Eastman Kodak	-4	46	-85	26
Exxon	0	13	23	15
Ford Motor	-2	-28	17	-5
General Dynamic	-1	335	39	18
General Electri	-10	-21	21	3
General Foods	-7	-6	3	-6
General Motors	-8	-63	10	-39
Georgia Pacific	-4	199	0	-6
Goodyear	-3	26	-4	23
Gulf Oil	-1	-34	-7	-31
Hewlett Packard	12	36	-82	11
Honeywell	-9	14	-65	-7
IBM	-2	9	-66	-22
International H	38	47	-50	-890
International P	-8	-91	4	-82
ITT	-17	-59	-44	-60

EXHIBIT 4

Company Name	1984			
	Sales Differenc	Earnings Differenc	Stock Differenc	EPS Differenc
Johnson & Johns	-2	-1	-4	1
Kraft	-11	-10	13	-14
Litton	2	-22	19	13
Lockheed	14	298	16	-32
LTV	40	-75	-52	-48
McDonnell Dougl	8	279	27	-17
MMM	1	-1	-93	-30
Mobil	0	-14	-2	-17
Monsanto	1	-15	-2	-1
Motorola	14	25	16	100
Nabisco	-7	-19	11	-15
Occidental	-21	15	6	166
Pepsico	-1	593	10	-28
Phillip Morris	1	-10	3	-2
Phillips Petrol	-1	14	15	10
Procter & Gambl	-1	-2	-35	-16
RCA	-1	32	20	-7
RJR Nabisco	0	12	8	0
Rockwell Intern	2	8	29	8
Sara Lee	-4	-5	17	-5
Shell	2	11	4	7
signal	-15	141	-3	138
Squibb	2	8	1	5
Sun	-4	21	-8	22
Swift	6	-62	3	-65
Tenneco	-11	-37	-20	-43
Texaco	14	-73	-21	-81
Union Carbide	1	297	-34	308
United Technolo	0	599	-56	-72
Unocal	5	14	22	9
USX	0	0	10	0
Westinghouse	-6	-15	-35	-49
W.R. Grace	3	-12	-2	1
Xerox	-10	-14	-8	-49

EXHIBIT 4

Company Name	1983			
	Sales Differenc	Earnings Differenc	Stock Differenc	EPS Differenc
Alcoa	11	973	-10	1000
Allied Signal	63	31	16	-112
Amoco	4	11	6	27
Anheuser Busch	25	-2	-5	7
Atlantic Richfi	1	3	-18	16
Bethlehem Steel	-9	45	-1	90
Boeing	10	-2	-26	7
Borden	2	6	2	19
Bristol Myers S	3	3	22	11
Caterpillar	-8	-79	-79	-34
Chevron	-14	24	-14	41
Chrysler	15	193	59	124
Coastal	8	51	44	77
Coca Cola	6	-12	-1	3
Conagra	22	53	6	8
Digital Equipme	11	-32	-33	-25
Dow Chemical	-1	-41	-1	-27
Dupont	2	-1	16	13
Eastman Kodak	-4	-49	-24	-28
Exxon	-4	19	3	45
Ford Motor	2	882	-6	310
General Dynamic	3	91	13	105
General Electri	-5	1	-15	9
General Foods	3	46	12	48
General Motors	7	170	-50	203
Georgia Pacific	9	-53	-14	-22
Goodyear	-2	-166	-45	-443
Gulf Oil	0	77	16	41
Hewlett Packard	3	6	11	21
Honeywell	7	-16	-8	7
IBM	8	15	23	30
International H	-15	66	214	121
International P	-3	27	15	70
ITT	-5	12	-59	46

EXHIBIT 4

Company Name	1983			
	Sales Differenc	Earnings Differenc	Stock Differenc	EPS Differenc
Johnson & Johns	-2	-21	-22	-3
Kraft	-5	15	-5	28
Litton	-8	-34	-48	-30
Lockheed	-12	3	35	0
LTV	-6	-127	19	-15
McDonnell Dougl	-2	4	-12	13
MMM	8	9	-3	30
Mobil	-4	21	-7	37
Monsanto	-4	-15	9	-1
Motorola	8	28	23	26
Nabisco	0	-6	-16	6
Occidental	7	248	5	187
Pepsico	-2	4	5	24
Phillip Morris	2	7	2	21
Phillips Petrol	2	21	-16	37
Procter & Gambl	0	9	-14	19
RCA	6	-9	17	0
RJR Nabisco	7	-8	2	-2
Rockwell Intern	4	19	19	16
Sara Lee	4	6	-5	11
Shell	3	11	-14	27
signal	62	-18	57	-43
Squibb	1	-1	-1	6
Sun	0	-7	16	9
Swift	0	-22	1	-7
Tenneco	-6	-20	-77	33
Texaco	-9	5	-7	23
Union Carbide	-5	-101	-11	-87
United Technolo	-5	-29	-25	-24
Unocal	3	-13	-13	47
USX	-9	-227	-11	-300
Westinghouse	-8	-10	-49	-4
W.R. Grace	-2	-77	-11	-62
Xerox	2	28	36	12

EXHIBIT 4

Company Name	1982			
	Sales Differenc	Earnings Differenc	Stock Differenc	EPS Differenc
Alcoa	14.6	0	28	3
Allied Signal	-6	-6	-27	-2
Amoco	-3	9.9	-4	-33
Anheuser Busch	12.3	23.2	38	27
Atlantic Richfi	-1	14.9	9	8
Bethlehem Steel	-6.4	0	-1	0
Boeing	-10	-22	8	-8
Borden	-9	-3.1	17	7
Bristol Myers S	-0.8	0.7	-5	4
Caterpillar	-18.8	-62.7	-5	-100
Chevron	-20	-27.1	-7	-33
Chrysler	7.9	-44.6	212	185
Coastal	1	164.9	-29	1009
Coca Cola	-0.7	6.5	-22	3
Conagra	14	28.9	15	14
Digital Equipme	-6.6	-22.9	-20	15
Dow Chemical	-4.5	-8.2	-3	-7
Dupont	52.5	13.8	8	-24
Eastman Kodak	5.7	13.1	1	7
Exxon	-7	1.9	18	-16
Ford Motor	3.9	-44.6	-65	96
General Dynamic	27	25	-1	37
General Electri	-3.7	8.9	26	8
General Foods	1	-4.1	-47	-18
General Motors	2.9	244.4	-132	224
Georgia Pacific	3.1	-27.9	3	31
Goodyear	5.5	52.4	99	70
Gulf Oil	4	-12.1	3	-13
Hewlett Packard	0.4	17.1	50	23
Honeywell	-8	-2	3	21
IBM	-0.6	13.1	28	34
International H	-14.8	-62.7	-34	-70
International P	-15.9	-29.9	-2	-34
ITT	6.2	38.3	17	31

EXHIBIT 4

Company Name	1982			
	Sales Differenc	Earnings Differenc	Stock Differenc	EPS Differenc
Johnson & Johns	3.2	-1.3	0	-8
Kraft	-4	-6.1	-10	0
Litton	-4.7	-12.1	-47	-1
Lockheed	6	50	22	1030
LTV	-27	-71	-15	0
McDonnell Dougl	-3	38	3	53
MMM	4.7	1.1	22	8
Mobil	-4	-28.1	18	4
Monsanto	-2.5	8.8	8	-2
Motorola	5.3	-8.1	16	-14
Nabisco	-1	10.9	-24	15
Occidental	24.8	-30.5	-3	-17
Pepsico	0.3	-17.5	-15	-32
Phillip Morris	6	11.9	10	15
Phillips Petrol	1	-12.1	0	-18
Procter & Gambl	2	8	1	27
RCA	2.3	310.9	-9	998
RJR Nabisco	10	5.9	-7	11
Rockwell Intern	7.3	3.9	0	11
Sara Lee	13	3.9	-2	10
Shell	-4	8.9	2	3
signal	-8.7	-48.1	13	-49
Squibb	5.2	260.7	4	34
Sun	2	-35.1	-12	-40
Swift	98	109.9	77	400
Tenneco	9.2	42.3	21	26
Texaco	-16	-30.1	9	-35
Union Carbide	-4.5	-21.2	1	-27
United Technolo	-3	9	-5	43
Unocal	-1	16.9	-7	11
USX	39	-85.1	-12	-91
Westinghouse	3.3	1.9	11	-1
W.R. Grace	0.5	18.8	-15	13
Xerox	43	-44	-27	-15