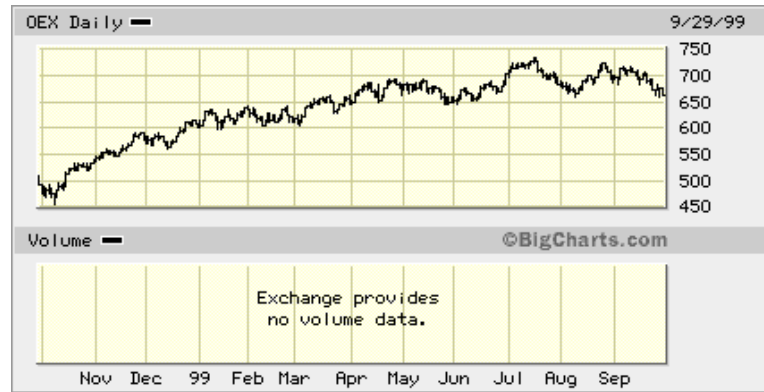


**Projected Annual Rate of Return for Common Stock  
Of Standard and Poor's 100 Companies**  
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This study attempts to express a relationship between various components used for stock valuation and annual rate of return (52-week percentage price change) of common stock. The data sample is comprised of companies listed in the Standard and Poor's 100 Index (S&P 100) as of September 25, 1998. Explanatory variables measured are long-term growth rate, current dividend yield, forward price to earnings ratio, price performance relative to the benchmark S&P 500 Index (both short-term and long-term performance), and market capitalization. From September 25, 1998 to September 30, 1999 (the specified time period), the average annual rate of return for common stock in the S&P 100 was 26.25 percent, while the entire index gained 32.7 percent. In this study, all explanatory variables are statistically significant at the 5 percent level, except for current dividend yield and price performance relative to the S&P 500 over the past 52-weeks. Long-term growth rate, price performance relative to the S&P 500 over the past three months and market capitalization display a positive relationship with annual rate of return. Current dividend yield and price performance relative to the S&P 500 over the past 52-weeks exhibit opposite the hypothesized sign, displaying a negative relationship. The results indicate that the forward price to earnings ratio, which was hypothesized to be ambiguous, has a negative effect on annual rate of return. There is question of possible bias, but conceptual arguments may explain the unexpected sign of the long-term relative strength variable.

The researcher did confront some initial multicollinearity, but applied proper remedies. The final equation successfully passes the "worthless" F-test. Additionally, the equation is not found to suffer from heteroskedasticity.

**Figure 1:** Standard and Poor's 100 Index



This chart shows daily price movement of the S&P 100 Index (Ticker: OEX) during the studied time period (September 25, 1998 to September 30, 1999). The index is made up of the 100 major, blue chips used in this sample.

## I. Background

What determines the annual rate of return for a stock? How can one predict which stock will outperform others? Or in other words, how can one predict which stock will earn the most for his/her money over the next year? Tell anyone you have the answers to these questions and it is guaranteed that you will draw a great deal of attention.

Due to the recent boom in the stock market over the past five years, investors are continually becoming more involved in the appreciation of their personal finances. It is common to hear about investors cashing out of mutual funds and reallocating funds into individual brokerage accounts or managed accounts. It is likely that individual investors will continue to be active in their equity selection – thus, today, it is more common to find stock market analyzers searching for the Holy Grail!

This study certainly will not offer the Holy Grail for long-term<sup>1</sup> stock appreciation, but it will examine the impact of various components of stock analysis on an individual stock's future performance. The data set is a cross-sectional study of the companies listed in the S&P 100 Index as of September 25, 1998. Each stock's performance is tracked from September 25, 1998 through September 30, 1999, incorporating a full calendar year of trading activity. Data components for all

explanatory variables are retrieved from a 1998 database, while only data for the dependent variable, annual rate of return, are from the 1999 database. Data are gathered for the following indicators for each S&P 100 company's stock: median Earnings Per Share (EPS) long-term estimated growth rate, current dividend yield, price to earnings ratio using a 12-month forward EPS estimate, 52-week/6-month/3-month price performance relative to S&P 500 price performance, and market capitalization.

Although companies within the S&P 100 are a small sample of the broad market, the companies within the index cover a vast majority of industries<sup>2</sup>. In the future, a better sample to use for a small study like this one would be companies listed in the S&P 500, which is a more accurate measure of the broad market.

Note that the S&P 100 follows a similar pattern of performance to the S&P 500:

**Figure 2:** S&P 100 (Ticker: OEX) Relative to the S&P 500



The chart shows daily price changes of both the S&P 100 and the S&P 500 for the relevant time period (September 25, 1998 to September 30, 1999).

A more complex study could use a much larger sample, possibly incorporating thousands of domestic companies whose common stock trades on the Nasdaq (National Association of Securities Dealers), New York Stock Exchange (NYSE) and American Stock Exchange (AMEX).

Additionally, it would be beneficial to measure the large sample over a longer time period.

## II. Model Specification

The hypothesized regression equation takes the following form:

$$AROR = f(LTG, DY, FWDPE, RS52W, RS6M, RS3M, MKTCP)^3$$

**Table 1:** Explanatory Variable Descriptions

All data for explanatory variables are as of 9/25/98

Name	Expected Sign	Definition
LTG	Positive	Median EPS long-term estimated growth rate
DY	Positive	Current dividend yield (dividend per share/price per share)
RS52W	Positive	Price performance relative to the S&P 500 over the past 52-weeks
RS6M	Positive	Price performance relative to the S&P 500 over the past 6-months
RS3M	Positive	Price performance relative to the S&P 500 over the past 3-months
MKTCP <sup>a</sup>	Positive	Market capitalization (current price times number of outstanding shares)
FWDPE <sup>b</sup>	Ambiguous	Current price divided by a 12-month forward EPS estimate

All variables are measured in percentage points except:

<sup>a</sup> Measured in Billion of 1999 US\$

<sup>b</sup> Numerical Value

The dependent variable, annual rate of return or 52-week percentage price change for an individual stock, is represented by *AROR* in this model. The units for this variable are in percentage points.

Future long-term growth potential of a stock can be estimated by two separate components: median EPS long-term estimated growth rate (*LTG*) and current dividend yield (*DY*). Both *LTG* and *DY* are expected to have a positive impact on annual rate of return. Both elements are

considered attractive features of long-term growth potential of an individual stock. *LTG* and *DY* are measured in percentage points.

When analyzing a stock, studying its past performance is extremely common. Often times, investors will look at both its near-term performance and its long-term performance. While the stock's individual performance is key, it is also imperative to see how the stock performed relative to benchmark indexes, such as the S&P 500. Thus, the relative strength components used in this study measure how the stock performed (in terms of price) relative to the price performance of the S&P 500 Index over 3 months, 6 months and 52 weeks<sup>4</sup>. Because a stock's past performance (both over the near- and long-term) is often seen as an attractive factor, all relative strength elements are hypothesized to have a positive effect on annual rate of return. The units for all relative strength explanatory variables are measured in percentage points.

Although all companies within the S&P 500 Index are considered to be "Large" Cap (large market capitalization), there is a good deal of variance among the companies in the sample. Over recent years, most investors have shown a preference to stocks with a large market capitalization, sometimes considering them to be safer investments. Market capitalization (*MKTCP*), which equals current price of the stock times its number of outstanding shares, is expected to have a positive impact on the stock's annual rate of return. *MKTCP* is measured in \$US billions, in 1998 dollars.

Another common element used in stock analysis is the price to earnings ratio. This ratio can be calculated numerous ways, depending on the type of earnings used. In this study, the ratio is calculated using current price divided by a 12-month forward EPS estimate, and is considered a forward P/E (*FWDPE*). The impact of P/E ratios on the attractiveness of an individual stock is fairly subjective. For example, one investor may consider a P/E ratio of say, 25 to be high – making the stock appear too "expensive" or overvalued. However, another investor may view a P/E ratio of 25 to be normal – possibly making the stock appear "cheap" or undervalued. Additionally, other conditions may affect the subjectivity, such as the inflation rate or other economic conditions. Therefore, the hypothesized sign of this coefficient appears ambiguous<sup>5</sup>. The units for *FWDPE* are numerical values (the \$ from price and earnings cancel out). Future studies may consider using a

dummy variable measuring the P/E of each stock relative to the P/E of either the S&P 100 or S&P 500<sup>6</sup>.

### III. Data Specification

All data are obtained from *Zack's Investment Database*. Zack's is an excellent source for this data because it compiles data from numerous professional financial analysts. Zack's database was first downloaded for the last week of the 3<sup>rd</sup> Quarter of 1998 (specifically 9/25/98). The data for all of the explanatory variables are from this database.

After the data for the explanatory variables were collected, the database was reloaded for the last week of the 3<sup>rd</sup> Quarter of 1999 (specifically 9/30/99). Table 2, below, provides summary statistics on the data retrieved from both databases. In some cases, an original S&P 100 company was acquired or dropped from the index by Standard and Poors over the 52-week period. These companies were withdrawn from the sample<sup>7</sup>.

**Table 2:** Summary Statistics

	AROR	LTG	DY	FWDPE <sup>b</sup>	RS52W	RS6M	RS3M	MKTCP <sup>a</sup>
Mean	26.25	12.80	1.86	17.48	-11.01	-8.56	-5.83	33.93
Standard Deviation	45.36	4.62	1.26	8.20	30.44	22.44	18.23	46.10
Maximum	222.64	30.00	5.07	54.71	83.69	58.13	38.81	270.26
Minimum	-43.55	3.00	0.00	-10.51	-77.94	-60.38	-51.23	0.79

All variables are measured in percentage points except:

<sup>a</sup> Measured in Billion of US\$, in 1998 dollars

<sup>b</sup> Numerical Value

The companies whose stock achieved the 5 **highest** annual rates of return were National Semiconductor (222.64 percent), Texas Instruments (212.09 percent), Northern Telecom (131.79 percent), Oracle Corp. (118.68 percent) and Cisco Systems (107.71 percent). The companies whose stock had the five **lowest** annual rates of return were Banc One Corp (-22.24 percent), Bethlehem

Steel Corp. (-23.61), American Electric Power Inc. (-27.48), Sears, Roebuck & Co. (-30.59 percent), and Monsanto Co. (-43.55 percent).

#### IV. Empirical Results

The Ordinary Least Squares method is used for estimating several specifications of the model in order to generate the most accurate regression equation.

**Table 3:** Regression Results  
(Absolute value of t-statistic in parentheses)<sup>8</sup>

	Equation 1	Equation 2	Equation 3
LTG	5.033424 (4.589828)*	5.031132 (4.575986)*	4.736859 (4.283817)*
DY	-3.205204 (0.823025)	-3.754505 (0.968231)	-3.366165 (0.856077)
FWDPE	-1.771717 (2.745290)*	-1.750391 (2.706306)*	-1.559277 (2.402173)*
RS52W	-0.654028 (2.407066)*	-0.411610 (2.242365)*	-0.230173 (1.433589)
RS6M	0.677976 (1.207491)	_____	_____
RS3M	0.098142 (0.208742)	0.551718 (1.946267)*	_____
MKTCP	0.152365 (1.598254)	0.162339 (1.704913)*	0.173623 (1.799161)*
C	-7.212297	-7.364178	-9.262427
R <sup>2</sup> :	0.350389	0.339626	0.311519
Adjusted R <sup>2</sup> :	0.298715	0.295106	0.273270
F-Statistic:	6.780803	7.628671	8.144519
N:	96	96	96

\*All t-scores are significant at the 5 percent level.

Equation 1 includes all the variables discussed in the model specification. Most of the variables have the signs predicted, except for *DY* and *RS52W*. Both variables were hypothesized to have positive coefficients, however, the regression generated estimated negative coefficients. For *FWDPE*, there was uncertainty about the predicted sign of the coefficient, and the sign resulted as a negative. The coefficients of *LTG*, *RS6M*, *RS3M* and *MKTCP* are all of the expected signs (positive).

The t-statistics for *DY*, *RS6M*, *RS3M*, and *MKTCP* are small enough that the null hypothesis (that the coefficient is zero) cannot be rejected using a one-tailed test at the 5 percent level of significance. Thus, *LTG*, *RS52W* and *FWDPE* were statistically significantly different from zero at the 5 percent level of significance. According to the “worthless equation” F-Test, at a 95 percent level of confidence, the equation is not worthless. As median EPS long-term estimated growth (*LTG*) increases by one percentage point, annual rate of return will increase by 5.033 percentage points, holding all else constant. As *RS52W* increases by one point, annual rate of return should decrease by 0.654 percentage points. When *FWDPE* increases by one point, annual rate of return should decrease by 1.772 percentage points, holding everything else constant.

At this point, the researched decided to look for any type of multicollinearity, especially among the relative strength variables. The following correlation table of simple correlation coefficients<sup>9</sup> was generated:

**Table 4:** Correlation Matrix

	<b>AROR</b>	<b>LTG</b>	<b>DY</b>	<b>FWDPE</b>	<b>RS52W</b>	<b>RS6M</b>	<b>RS3M</b>	<b>MKTCP</b>
<b>AROR</b>	1.0000	0.4399	-0.3123	-0.1334	-0.1665	-0.0629	-0.0533	0.0706
<b>LTG</b>	0.4399	1.0000	-0.5854	0.3311	0.1500	0.0928	-0.0239	0.1100
<b>DY</b>	-0.3123	-0.5854	1.0000	-0.2195	-0.1823	-0.1484	-0.0144	-0.1507
<b>FWDPE</b>	-0.1134	0.3311	-0.2195	1.0000	0.5677	0.5459	0.4345	0.4310
<b>RS52W</b>	-0.1665	0.1500	-0.1823	0.5677	1.0000	<b>0.8500</b>	0.6257	0.3325
<b>RS6M</b>	-0.0629	0.0928	-0.1484	0.5459	<b>0.8500</b>	1.0000	<b>0.8613</b>	0.3551
<b>RS3M</b>	-0.0533	-0.0239	-0.0144	0.4345	0.6257	<b>0.8613</b>	1.0000	0.2793
<b>MKTCP</b>	0.0706	0.1100	-0.1507	0.4310	0.3325	0.3551	0.2793	1.0000



Based on Table 4, a high degree of correlation was found between *RS6M* and *RS52W* (.8500) and *RS6M* and *RS3M* (.8613).

The variance inflation factor (VIF) is a common method used to detect the severity of multicollinearity by examining the extent to which a given explanatory variable can be explained by the other explanatory variables in the equation. The VIF value estimates to what degree multicollinearity increases the variance of an estimated coefficient. A high VIF indicates the variance of the estimated coefficient has been increased, thus decreasing the t-scores. Generally, if the VIF value > 5, multicollinearity is severe.

**Table 5:** VIF Statistics – Equation 1

	Unadjusted R <sup>2</sup>	(1-R <sup>2</sup> )	VIF
<b>LTG</b>	0.407946	0.592054	1.689035
<b>DY</b>	0.368416	0.631584	1.583321
<b>FWDPE</b>	0.457953	0.542047	1.844858
<b>RS52W</b>	0.777956	0.222044	4.503612
<b>RS6M</b>	0.904274	0.095726	<b>10.446483</b>
<b>RS3M</b>	0.793227	0.206773	4.836221
<b>MKTCP</b>	0.213405	0.786595	1.271302

Based on Table 5, Equation 1 suffers from a high degree of multicollinearity. Thus, the researcher felt justified in withdrawing *RS6M*. A new regression (Equation 2) was run with all the same variables, except *RS6M*. See Table 3.

Again, all variables have the predicted sign except *DY* and *RS52W*, which have negative estimated coefficients<sup>10</sup>. The coefficients of *LTG*, *RS3M* and *MKTCP* all have the predicted positive coefficients. *FWDPE* retains the estimated negative coefficient.

In Equation 2, five of the six variables are statistically significantly different from zero at the 5 percent level of significance. *LTG*, *RS52W* and *FWDPE* are again significant, but the omission of *RS6M* results in the statistical significance of *RS3M* and *MKTCP*. Again, *DY* is not significant at the 5 percent level. According to the “worthless” equation F-Test, the equation is not worthless at the 95 percent level of confidence. As median EPS long-term estimated growth (*LTG*) increases by one

percentage point, annual rate of return will increase by 5.031 percentage points. As *FWDPE* increases by one point, annual rate of return should decrease by 1.750 percentage points. As *RS52W* increases by one point, annual rate of return should decrease by 0.412 percentage points. As *RS3M* increases by one percentage point, annual rate of return will increase by 0.552 percentage points. Finally, as *MKTCP* increases by 1 billion \$US, in 1998 dollars, annual rate of return will increase 0.162 percentage points, holding all else constant.

VIF statistics are generated for Equation 2.

**Chart 6:** VIF Statistics – Equation 2

	Unadjusted R <sup>2</sup>	(1-R <sup>2</sup> )	VIF
<b>LTG</b>	0.407945	0.592055	1.689032
<b>DY</b>	0.359679	0.640321	1.561717
<b>FWDPE</b>	0.457547	0.542453	1.843478
<b>RS52W</b>	0.510982	0.489018	<b>2.044915</b>
<b>RS3M</b>	0.428282	0.571718	<b>1.749114</b>
<b>MKTCP</b>	0.207456	0.792544	1.261760

Note how the VIF Statistics for *RS52W* and *RS3M* are much smaller now that *RS6M* has been omitted. Before omitting *RS6M*, they were 4.503612 and 4.836221, respectively.

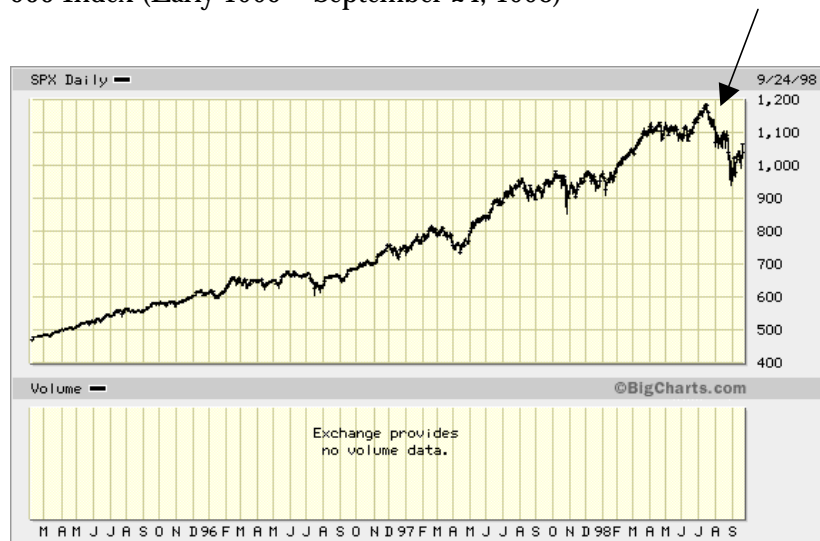
Satisfied with these results, a final test is conducted to test for heteroskedasticity (violation of the assumption that the variance of the error term is constant). The White test and Goldfeld-Quandt tests are used<sup>11</sup>. The White test has a strong advantage over both the Park test (not conducted in this study) and the Goldfeld-Quandt test because it does not assume any particular form of heteroskedasticity. When the White test was applied to this study, the critical chi-square value was found to be greater than the test statistic at the 2.5 percent level of significance, thus it was not possible to reject the possibility of homoskedasticity. In terms of the Goldfeld-Quandt test, the calculated GQ value was less than the  $F_{crit}$  value at the 5 percent level of significance, meaning homoskedasticity. Thus, due to the results of the two tests, the researcher felt confident in rejecting the likely possibility of heteroskedasticity.

When reviewing this project, the researcher realized there might be a problem with including *RS3M* in the model specification. The researcher's reasoning: the data for the explanatory variable *RS52W* incorporates the data for *RS3M*. In this equation, is it fair to say *ceteris parabis* (holding all else constant) when referring to changes in *RS3M*? Since *RS52W* incorporates *RS3M*, the researcher ran a third regression (Equation 3), omitting *RS3M* from the equation. See Table 3. Note in this equation, *DY*, *FWDPE* and *RS52W* all retain the negative coefficient. *LTG* and *MKTCP* remain positive. *LTG*, *FWDPE* and *MKTCP* are statistically significant at the 5 percent level of significance. *DY* and *RS52W* again fail the t-test. The equation safely passes the "worthless" equation F-test at the 95 percent level of significance. Note, by omitting *RS3M*, both the  $R^2$  and adjusted  $R^2$  decrease in value and the constant term (C) increases. Because the estimated coefficients did not change much and the statistical significance of the estimated coefficients remained constant (in terms of statistically significant or not), the researcher did not see a major conflict of including both *RS52W* and *RS3M*. Conceptually, it is common for investors to consider both short- and long-term performance. Therefore, on the basis of theory and no major change by omitting *RS3M*, Equation 2 is referred to as the final equation.

## **V. Conclusion**

The major issue the researcher confronted in this project was the negative estimated coefficient of *RS52W*. It is possible that omitted variable bias may have caused the coefficient to be negative. Was a relevant variable not included? A potential omitted variable could be beta, the sensitivity of a stock's returns to the return on some market benchmark, like the S&P 500. However, the explanatory variable beta may not generate an estimated negative coefficient. This would not solve for the negative bias. If the researcher were to hypothesize the sign of beta, it would be fair to hypothesize ambiguity, based on the risk preference of the individual investor. The researcher considered there might be some type of conceptual reasoning to the negative coefficient.

**Figure 3:** S&P 500 Index (Early 1995 – September 24, 1998)



This chart of the S&P 500 Index exhibits a bull market in its fourth year. Note the price volatility of the index beginning in July 1998 and continuing into late September 1998 (the beginning of the studied time period). Looking at this chart is helpful in understanding why *RS52W* may have a negative coefficient. Investors may have felt that any stock that had outperformed the S&P 500 over the past 52 weeks (especially those that outperformed to a high degree) may be overvalued and overextended. An investor who researched a stock, like Cisco Systems, and saw that it had outperformed the S&P 500 over the past 52-weeks by almost 84 percent, might think they missed the “ride”. Little would they know, the stock advanced more than 107 percent from September 25, 1998 to September 30, 1999.

In addition to an overvalued market, investors were paying attention to two major happenings that were occurring during this time period. First, consider the problems with Long Term Capital Management, a reputable hedge fund. Long Term Capital Management suffered enormous losses caused by bad debt. The fund had leveraged up to 30 times its capital, which is very atypical of hedge funds<sup>12</sup> (Hedge Fund Association). The fund needed to borrow \$3.5 billion from Wall Street’s top investment banks to prevent collapsing (Cnnfn.com). The fund almost had to liquidate billions of dollars to meet minimum capital requirements. The incident was a major wake-up call, especially for securities regulators, regarding the complexities of hedge funds.

Investor sentiment was also negatively altered by the developing Asian Financial Crisis. The crisis stemmed from a combination of problems, noting poor supervision of the financial sector, poor assessment and management of financial risk, and the allocation of foreign capital to finance poor-quality investments. These problems led to a slumping Japanese economy, highly vulnerable currencies and negative domestic consumer business sentiments, which led to the deflation of asset prices and a negative wealth impact on domestic demand (Visionews).

These two events might have affected investors' perspective on stocks that outperformed the S&P 500 over the past year. Instead of rewarding a stock for its momentum, investors may have been concerned that the stock was overvalued.

Overall, this regression serves as an excellent example for future regression projects. This analysis could be of great help to analysts who believe certain valuation indicators are more imperative to the success of their analysis. For example, an analyst who believes forward price to earning ratios have a much greater impact on annual rate of return than long-term growth rates, may want to reconsider. As this project showed, long-term growth rate had more than double the impact.

## **VI. Suggestions**

In the future, the study would likely be more useful and accurate if a larger sample (say of the S&P 500 or the 7,000 stock universe provided in Zacks) were used. However, as seen in this study, unexpected market and economic events might have a major impact on stock performance. Therefore, the study should also be a time-series study, possibly going back 20-30 years. The units of the variables will remain constant, except for market capitalization, where \$US will need to be adjusted for inflation.

In terms of model specification, it may be helpful to try a regression using beta as an explanatory variable, to see what type of impact it may have. Also, researchers may want to consider using P/E ratio as a dummy variable, where (for example) the variable = 0 if  $PE_i < PE_{S\&P500}$  and = 1

if  $PE_j \geq PE_{S\&P500}$ . Overall, the best suggestion would be to conduct a cross-sectional, time-series study with a large sample over an extended period of time.

## APPENDIX: DATA

<u>Observ.</u>	<u>Ticker</u>	<u>AROR</u>	<u>LTG</u>	<u>DY</u>	<u>FWDPE</u>	<u>RS52W</u>	<u>RS6M</u>	<u>RS3M</u>	<u>MKTCP</u>
1	ALT	-11.74	15.00	3.44	10.92	-42.51	-23.11	-7.37	3.67
2	AA	66.90	9.00	1.39	12.64	-19.17	8.87	18.84	13.151
3	AEP	-27.48	3.00	5.07	13.82	-6.18	2.26	12.71	9.031
4	AXP	69.41	14.00	1.12	15.35	-10.77	-20.07	-20.87	36.739
5	AGC	-2.15	12.00	2.25	15.12	17.80	6.81	0.95	16.91
6	AIG	40.63	14.00	0.28	20.44	3.52	-1.19	-11.51	82.907
7	AIT	30.23	9.70	2.45	19.50	35.49	11.28	19.65	54.017
8	T	7.23	12.00	2.21	16.24	18.72	-3.96	19.23	107.703
9	ARC	19.07	8.00	3.92	22.46	-21.64	2.35	-0.91	23.363
10	AVP	46.85	16.00	2.64	15.59	-24.70	-32.77	-27.90	6.782
11	BHI	34.50	18.00	2.15	13.94	-55.92	-42.20	-32.50	3.645
12	ONE	-22.24	13.00	3.40	11.45	-19.50	-23.07	-13.31	31.498
13	BAC	3.01	14.00	2.20	11.88	-21.43	-22.96	-25.58	42.926
14	BAX	-0.73	13.00	1.95	21.36	1.03	13.80	20.70	16.809
15	BEL	36.24	8.00	3.26	16.21	7.63	3.64	11.50	73.402
16	BS	-23.61	6.00	0.00	7.69	-20.56	-35.13	-25.82	1.167
17	BDK	9.72	15.00	1.13	13.87	4.30	-13.65	-26.01	3.945
18	BA	21.26	15.00	1.61	18.49	-42.48	-33.18	-21.42	35.059
19	BCC	25.80	8.00	2.19	35.82	-40.41	-18.45	-8.97	1.542
20	BMJ	38.14	13.00	1.55	25.51	10.35	2.98	-7.26	100.093
21	BC	92.31	12.50	3.85	5.58	-66.51	-58.82	-41.48	1.288
22	BNI	-10.52	12.00	1.58	11.60	-13.96	-1.85	-0.34	14.339
23	CEN	-10.08	20.00	0.00	27.28	47.99	17.27	12.09	4.317
24	CHA	56.55	6.00	0.61	15.73	-51.00	-30.75	-26.43	3.15
25	CI	32.42	10.00	1.69	13.02	-1.34	5.50	5.10	14.448
26	CSCO	107.71	30.00	0.00	43.39	83.69	58.13	18.06	103.299
27	CCI	63.04	13.00	2.29	10.40	-31.61	-35.41	-29.89	45.446
28	CGP	23.19	14.00	0.76	14.62	-3.37	2.32	1.80	6.977
29	KO	-9.01	17.00	1.07	32.14	-17.93	-23.97	-27.78	138.53
30	CL	42.57	14.00	1.58	24.32	-6.93	-13.91	-13.66	20.533
31	COL	-0.85	12.50	0.36	13.24	-30.22	-28.04	-18.73	13.773
32	CSC	2.50	17.00	0.00	26.70	59.87	26.08	7.58	9.881
33	DAL	-8.91	8.00	0.19	7.72	-4.97	-5.09	-13.92	7.573
34	DIS	2.68	16.10	0.82	28.16	-12.51	-25.07	-20.75	52.498
35	DOW	24.27	8.00	4.05	15.51	-13.97	-5.38	-2.40	19.274
36	DD	0.64	10.00	2.38	16.82	-15.80	-15.46	-15.38	66.299
37	EK	-9.27	10.50	2.18	16.20	14.33	34.21	21.05	26.105
38	ETR	1.05	3.00	4.04	14.12	2.81	9.06	13.06	7.321
39	XON	9.41	7.00	2.40	22.63	-3.72	8.90	2.96	166.726
40	FDX	38.84	14.00	0.00	11.31	-42.77	-25.87	-11.45	7.474
41	FCN	-11.11	11.00	2.45	12.12	-14.16	-18.85	-13.18	20.58
42	FLR	0.15	12.00	1.98	13.20	-31.64	-8.68	-12.16	3.059
43	F	3.25	7.00	3.49	9.43	-0.90	9.14	-8.75	55.344
44	GD	13.26	8.00	1.65	17.99	8.72	28.66	25.49	6.74
45	GE	42.06	13.00	1.44	26.78	10.01	2.08	0.23	270.259
46	GM	6.09	6.00	3.42	8.11	-19.81	-7.78	-6.80	38.271
47	HAL	40.91	15.00	1.73	14.22	-48.71	-38.45	-29.59	7.6

<u>Observ.</u>	<u>Ticker</u>	<u>AROR</u>	<u>LTG</u>	<u>DY</u>	<u>FWDPE</u>	<u>RS52W</u>	<u>RS6M</u>	<u>RS3M</u>	<u>MKTCP</u>
48	HET	86.34	18.00	0.00	9.53	-41.82	-38.91	-33.58	1.437
49	HRS	-16.41	12.00	2.93	10.45	-35.72	-30.80	-18.79	2.62
50	HIG	-12.81	12.00	1.69	13.08	4.68	-3.89	-4.70	11.725
51	HNZ	-19.13	11.00	2.57	21.36	7.51	-4.05	4.34	19.559
52	HWP	78.32	15.00	1.18	15.97	-31.19	-5.66	3.75	56.355
53	HON	67.48	14.50	1.74	13.10	-14.36	-20.94	-17.14	8.097
54	INTC	71.34	20.00	0.18	24.77	-14.09	27.30	32.30	148.365
55	IBM	87.27	12.00	0.66	18.46	17.69	33.42	27.18	124.564
56	IFF	8.05	11.00	4.43	15.61	-39.61	-22.23	-15.81	3.578
57	IP	-0.13	7.00	2.06	24.84	-18.66	6.86	22.54	14.882
58	IIN	-7.02	11.00	1.77	13.63	-5.69	-4.94	-0.06	4.005
59	JNJ	15.66	13.00	1.29	26.45	22.17	11.13	15.87	104.649
60	KM	-11.54	12.00	0.00	11.59	-18.18	-21.03	-27.31	6.412
61	LTD	52.22	13.00	2.17	14.65	-10.46	-17.74	-21.88	5.455
62	MKG	45.06	12.00	3.26	8.67	-48.66	-44.71	-27.00	1.475
63	MAY	-0.06	11.00	2.31	14.85	-8.49	-8.80	-9.90	12.759
64	MCD	50.22	13.00	0.63	20.80	8.90	-2.13	-11.52	39.195
65	MRK	0.48	14.00	1.64	27.24	18.82	10.73	8.70	156.606
66	MER	31.31	12.00	1.83	10.80	-35.21	-41.21	-41.77	18.782
67	MMM	23.55	10.00	2.96	17.62	-25.66	-16.01	-0.86	30.013
68	MOB	26.25	8.00	2.94	20.31	-5.17	7.35	7.74	60.68
69	MTC	-43.55	20.00	0.19	54.71	41.34	16.27	21.62	37.255
70	NSM	222.64	17.00	0.00	-10.51	-77.94	-51.71	-16.12	1.644
71	NSC	-12.31	12.00	2.72	12.99	-20.79	-12.15	7.67	11.155
72	NT	131.79	20.00	0.74	18.09	-28.94	-29.20	-21.17	21.252
73	OXY	0.28	11.20	4.43	19.92	-19.95	-17.29	-8.73	7.965
74	ORCL	118.68	25.00	0.00	22.67	-30.42	14.20	38.81	28.169
75	PEP	4.93	15.00	1.71	21.00	-31.48	-22.96	-23.55	44.829
76	PNU	-3.58	12.00	2.14	28.88	26.63	20.96	20.61	25.686
77	PRD	2.70	13.50	2.36	10.01	-55.69	-36.93	-26.30	1.122
78	PG	38.03	13.00	1.62	24.27	-8.06	-13.10	-16.42	94.312
79	RAL	-6.14	12.00	1.31	26.01	-6.33	-5.77	-12.51	9.542
80	RTN.B	-12.10	10.00	1.58	13.10	-22.78	-7.80	-3.49	11.929
81	ROK	31.09	12.00	2.68	16.78	-45.81	-27.86	-13.02	7.467
82	SLB	16.73	20.00	1.48	18.44	-44.15	-27.37	-18.23	25.364
83	S	-30.59	13.00	2.12	11.39	-31.25	-17.68	-23.42	16.994
84	SO	-11.04	4.00	4.64	15.59	14.20	11.63	14.96	20.149
85	TAN	78.47	16.00	0.74	20.75	43.69	17.46	15.20	5.42
86	TEK	107.42	10.00	3.00	10.50	-67.98	-60.38	-51.23	0.794
87	TXN	212.09	22.00	0.63	20.76	-27.72	8.97	1.91	20.969
88	TOY	-9.96	10.00	0.00	9.40	-56.06	-38.04	-21.95	4.426
89	UCM	0.17	3.90	4.34	15.02	42.72	12.81	15.20	8.002
90	UIS	72.93	25.00	0.00	20.27	76.96	41.87	-0.27	6.342
91	UTX	44.88	15.00	1.81	14.40	-12.82	-11.47	-7.46	18.1
92	WMT	50.15	14.00	0.50	30.22	54.58	29.58	11.99	139.536
93	WAMU	-17.53	15.00	2.37	10.01	-30.66	-22.62	-13.24	13.529
94	WY	26.82	10.00	3.65	20.39	-34.00	-17.56	5.08	8.718
95	WMB	23.23	17.00	2.06	22.30	8.57	-8.29	-5.68	12.347
96	XRX	3.00	17.00	1.73	15.83	-8.57	-21.56	-10.52	27.397



## REFERENCES

ABC News. "BP, Amoco to Merge."

<http://more.abcnews.go.com/sections/business/dailynews/oilmerger980811/index.html>.

About.com. "Travelers/Citicorp Merger Approved."

[http://financeservices.about.com/business/financeservices/library/news/blcitigroup.htm?terms=citicorp+and+travelers&PM=113\\_300\\_T](http://financeservices.about.com/business/financeservices/library/news/blcitigroup.htm?terms=citicorp+and+travelers&PM=113_300_T).

Canada News Wire. "Tyco International Announces Merger Agreement with AMP Incorporated Valued at \$11.3 Billion." <http://www.newswire.ca/releases/November1998/23/c7408.html>.

CBC. "Chrysler, Daimler announce merger."

<http://newsworld.cbc.ca/archive/html/1998/05/07/merger980507b.html>.

Cnnfn.com. "LTCM to repay debts." <http://cnnfn.com/1999/06/18/companies/lcmm/>.

Hedge Fund Association. "Hedge Funds Another Victim in Long Term Capital Fallout."

<http://www.magnumfund.com/longterm.html>.

Hoovers Online. "Alcoa, Inc." <http://hoovers.com/co/capsule/8/0,2163,10068,00.html>.

Hoovers Online. "Nortel Networks Corporation."

<http://hoovers.com/co/capsule/4/0,2163,41824,00.html>.

Microsoft Money Central. <http://www.moneycentral.com>.

Naplesnews.com. "Merger: NationsBank, BankAmerica set for \$65 billion merger."

<http://www.naplesnews.com/today/business/d198972a.htm>.

Perwimas Telecommunications. "Managing the Asian Financial Crisis."

<http://www.visionews.com/visionews2/intl/main.htm>.

*Zack's Investment Database*. Zacks.com 1999. [also available at <http://www.reswizard.com>].

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<sup>1</sup> In this study, long-term will be considered the time period of 52 weeks or greater.

<sup>2</sup> The stocks used in the sample can be found in the Appendix, listed by industry grouping.

<sup>3</sup> Again, data for the explanatory variables were retrieved from the 1998 database. Data for the dependent variable were retrieved from the 1999 database.

<sup>4</sup> For any of the three relative strength indicators, a score of 25 would conclude the individual stock outperformed, in terms of price, the benchmark S&P 500 index by 25 percent over the specified time period (3 or 6 months, 52 weeks).

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<sup>5</sup> The P/E ratio for the benchmark S&P 500 during the 3<sup>rd</sup> Quarter of 1998 period was 23.3. The average P/E of the stocks used in the sample is 17.48.

<sup>6</sup> For example, 0 if  $PE_i < PE_{S\&P500}$ ; 1 if  $PE_i \geq PE_{S\&P500}$ , where  $i$  is the  $i$ th company's stock.

<sup>7</sup> See specific situations in the Appendix.

<sup>8</sup> All statistical tests can be found in the Appendix.

<sup>9</sup> Simple correlation coefficients measure the direction and strength of the linear relationship between two variables. Highly correlated coefficients were those with simple coefficients  $\geq 0.7$ .

<sup>10</sup> An explanation regarding the estimated negative coefficient of *RS52W* is discussed in the conclusion of this paper.

<sup>11</sup> See Appendix for calculations.

<sup>12</sup> Hedge funds usually leverage no more than two times its capital, while most use significantly less than that, some none at all.