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# The Significance of Price-Earnings Ratios on Portfolio Returns

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THE SIGNIFICANCE OF  
PRICE-EARNINGS RATIOS ON  
PORTFOLIO RETURNS

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## THE SIGNIFICANCE OF PRICE-EARNINGS RATIOS ON PORTFOLIO RETURNS

The one-period capital asset pricing model (CAPM) developed by Sharpe [1964] and elaborated on by Lintner [1965] and Black [1972], asserts that, in equilibrium, the expected return on any asset equals the risk-free rate plus a risk premium based on the asset's riskiness relative to the market. A substantial amount of empirical research substantiates the CAPM's assertion of market efficiency, i.e. abnormal returns cannot be obtained after adjusting for risk (see [Fama, 1970] for a review of many of these studies).

Yet other studies challenge the validity of the efficient market hypothesis. One such group contends that low price-earnings (P/E) ratio securities tend to outperform high P/E stocks. Nicholson [1960, 1968] showed that low P/E stocks consistently achieved higher returns than high P/E issues. McWilliams [1966] and Miller and Widmann [1966] confirmed Nicholson's findings. Breen [1968] also detected higher-than-market returns on low P/E stocks. In his study he pointed out a potential industry effect due to the tendency for low P/E securities to cluster in certain industry groups.

But, none of these pioneering studies formally threatened the CAPM's validity because they neglected to adjust returns for risk. Since the CAPM asserts that higher risk warrants higher return, the findings that low P/E stocks generate higher-than-market returns is not surprising if one believes that low P/E stocks are riskier than their high P/E counterparts. However, Basu [1977] mounted a more robust challenge to the CAPM by demonstrating that low P/E portfolios, on average, earned higher rates of return, even after adjusting for risk. The contention that returns on low P/E securities are higher than suggested by the underlying risk violates the foundation of the CAPM -- thus implying that the CAPM may be misspecified or even false.

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the calculated returns and the estimated risk (beta) is biased downward. Roll [1980] connected the findings of the above mentioned studies by revealing that the abnormal returns of small firms could be caused by a significant bias in the measurement of their betas, which in turn was the result of infrequent trading. After adjusting for beta bias, abnormal returns no longer existed for infrequently traded stocks.

Smith [1978] found that risk underestimation was particularly acute when small trading intervals (such as daily) were used, but as the trading interval was lengthened, the beta bias tended to disappear. For this study, quarterly trading intervals are used to overcome the intervaling problem. Also, only stocks with an average monthly trading volume exceeding 25,000 shares are included in the sample (no selected stock experienced less than 10,000 shares traded in any single month during the observed time period). The combined effects of the lengthening of the trading interval, the deletion of small firms, and the elimination of infrequently traded securities compensates for any downward beta bias that might otherwise exist.

A final consideration pertains to the effect of industry bias. Some industries, such as food, are typified by low P/E ratio securities. Thus any broad grouping of stocks in rank order of P/E ratio would most likely enter proportionately more securities from characteristically low ratio industries into the lowest P/E category, while virtually ignoring stocks from high P/E industries. In this manner, most food company stocks, for example, would be classified into the lowest P/E groups, whereas most electronics stocks (high P/E's) would be included in the highest ratio categories. Consequently, any detected return differences among groups might be caused by variances in industry performance rather than the P/E level.

This potential bias is eliminated by alternatively analyzing stocks by industry classification. In this study, securities from the electronics, paper/container, and food industries are alternatively analyzed. These industries are selected to provide samples of stocks with higher-than (electronics), average (paper/container), and lower-than (food) market price volatility. The stocks of firms from each individual industry are grouped into P/E quintiles -- thus all quintiles consist entirely of stocks from a single industry. Such a grouping permits the returns experienced by low ratio food stocks, for instance, to be compared to those achieved by high P/E food stocks. Since, for analysis purposes, all stocks belong to the same industry, any potential industry bias is eliminated.

#### The Data

The data for this study is retrieved from the COMPUSTAT data tapes. Forty firms from each of the electronics, paper/container, and food industries are selected, subject to the following constraints: (i) the fiscal year-end of the firm is December 31 or quarterly intervals thereof; (ii) the firm's stock continuously traded from December 31, 1969 to June 30, 1980; (iii) average monthly trading volume for each stock exceeded 25,000 shares; (iv) the firm had minimum 1980 net sales of \$100 million; and (v) the relevant return, risk, and accounting data are available. Thus, a total of 120 firms are included. Market data is obtained using Standard & Poor's '400' index (S & P 400) and the 91-day Treasury bill interest rate is used as a surrogate for the risk-free rate.

#### Methodology

The P/E ratio of each sample security was computed quarterly from the beginning of 1970 to mid-year 1980 (a total of 42 consecutive quarters). The

numerator of the ratio is the closing market price per share at the end of the quarter and the denominator is the sum of the four most recent quarterly earnings per common share (fully diluted before extraordinary items). For purposes of this study, it is assumed that investors have already anticipated that quarter's earnings per share amount and have correspondingly acted upon that information when determining a stock's price at quarter-end. This assumption is substantiated by the findings of Ball and Brown [1968].

The stocks in each industry sample were ranked by P/E magnitude and grouped into portfolio quintiles. The quarterly returns on each of these quintiles were then calculated, assuming equal initial investment in each stock, as follows:

$$R_q = (P_q - P_{q-1} + D_q) / P_{q-1}$$

where  $R_q$  = the quarterly return (percentage) in quarter  $q$ ;

$P_q$  = the market price per share at the end of quarter  $q$ ;

$D_q$  = the cash dividend paid per common share during quarter  $q$ .

This procedure was repeated at the end of each quarter of the selected time period (1970 year-begin to mid-year 1980), thus providing 42 quarters of return data for each of the five P/E portfolios. The composition of each portfolio was adjusted quarterly to reflect shifts in P/E rankings. Thus, for example, if a stock's P/E increased beyond the boundaries of its group, that stock would be "sold" at quarter-end and replaced in the portfolio with the lowest P/E issue from the next highest category. The "sold" stock would then advance to a higher P/E group and be "bought" for that portfolio.

The above return calculation formula does not compensate for risk. The CAPM postulates that, if capital markets are in equilibrium, returns incorporate a risk premium. When the assumptions of the CAPM are met, a security's risk premium, i.e. its expected return less the risk-free rate of interest, is

proportional to the risk premium of the overall market and is expressed as follows:

$$E(R_i) = R_f + \beta_i [E(R_m) - R_f]$$

where  $E(R_i)$  = the equilibrium expected return on asset  $i$ ;

$R_f$  = the risk-free rate of interest;

$E(R_m)$  = the expected return on the market portfolio;

$\beta_i$  = the risk of asset  $i$  relative to the market portfolio (the "beta" coefficient).

The beta coefficient is the crucial risk gauge, measuring an asset's covariance with the market as a whole. It is expressed as follows:

$$\beta_i = \text{COV}_{R_i, R_m} / \sigma_m^2$$

Thus, the CAPM implies that a particular asset will generate a higher than market return only if that asset has a higher than market beta ( $>1.0$ ). Consequently, a low P/E portfolio should outperform the market only if it has a higher than market beta.

Treynor's return-to-volatility measure was used to adjust security returns for beta risk. This procedure converts a security's expected return,  $E(R_i)$ , to a risk-adjusted expected return,  $E(R_i)'$ , in the following manner:

$$E(R_i)' = R_f + [E(R_i) - R_f] / \beta_i$$

The mean, risk-adjusted quarterly return of each P/E quintile for the 42 quarters is computed. A geometric progression is used to incorporate the effect of compounding and is expressed as follows:

$$\bar{R}_q = \prod_{q=1}^n (1 + R_q)^{1/n} - 1$$

where  $\bar{R}_q$  = the geometric mean quarterly return;

$R_q$  = the percentage return for quarter,  $q$ ;

$n$  = the number of quarters in the compounding period.



The resultant mean quarterly returns for each quintile are observed to determine if significant return differences do exist among the various P/E portfolios. The results are presented and explained in the next section.

### Empirical Results

Table 1 summarizes the mean quarterly return and risk data for the three test industries over the experimental period from January 1970 to July 1980 (42 quarters). The data are arranged into five P/E portfolios (1 = lowest P/E, 2, 3, 4, 5 = highest P/E).

TABLE 1  
SUMMARY OF RESULTS  
January 1970 - July 1980

Industry	Quintile					Industry Mean
	1	2	3	4	5	
<b>Electronics</b>						
Mean Quarterly Return	9.24	5.45	5.11	2.96	2.21	5.05
Mean Quarterly Return*	8.53	4.71	4.34	2.53	1.86	4.51
Mean P/E Ratio	7.1	10.3	13.4	17.4	25.5	14.7
Mean Beta	1.15	1.12	1.13	1.19	1.29	1.18
<b>Paper/Container</b>						
Mean Quarterly Return	5.37	3.40	3.99	2.38	0.94	3.41
Mean Quarterly Return*	5.26	3.29	4.21	2.21	0.83	3.28
Mean P/E Ratio	6.7	8.5	10.2	12.4	20.2	11.6
Mean Beta	1.02	1.02	1.00	1.03	1.02	1.02
<b>Food</b>						
Mean Quarterly Return	5.53	3.79	2.70	0.81	0.65	2.83
Mean Quarterly Return*	5.97	4.12	2.97	0.89	0.71	3.04
Mean P/E Ratio	7.2	9.5	11.1	12.8	16.8	11.5
Mean Beta	0.90	0.85	0.86	0.86	0.90	0.87

\*Risk-adjusted.

Several observations on the data in Table 1 seem pertinent. First, the mean industry betas, based on the pooled 1970-1980 quarterly data, differ considerably among the three industries. The electronics industry's average beta of 1.18 exceeded the paper/container and food industries' mean betas of 1.02

and 0.87, respectively. These average betas are compatible with the assumption that the three industries are representative of stocks with greater-than (electronics), similar (paper/container), and lower-than (food) market price variability. Interestingly, in most cases the mean beta did not differ significantly among the P/E quintiles for a given industry. For both the paper/container and food industries, for example, the mean beta was identical for the lowest and highest P/E groups -- thus implying that neither quintile possessed more systematic risk than the other. The high P/E electronics group, however, did exhibit greater systematic risk ( $\beta = 1.29$ ) than did the low P/E quintile ( $\beta = 1.15$ ). Overall, the mean betas reveal that low P/E's are not associated with more systematic risk than are high P/E's. In fact, just the opposite conclusion emerges for electronics stocks.

The second observation focuses on the mean quarterly P/E ratios. In each industry the mean P/E differs significantly across the portfolio quintiles. The greatest dispersion in P/E's is detected in the electronics industry and the lowest is observed in the food industry. Thus, a trend emerges -- the higher the systematic risk of an industry's stocks, the greater the variability in those stocks' underlying P/E ratios.

Finally, Table 1 reveals important trends in quarterly returns across the P/E portfolios. For all industries the low P/E portfolio substantially outperformed the high ratio portfolio. In fact, with only one exception (quintile 2 in the paper/container industry), the returns decline monotonically as the portfolio mean ratio increases. However, contrary to the CAPM, the higher returns experienced by the low P/E portfolio were not characterized by higher levels of systematic risk. Thus, after adjusting returns for systematic risk (Treyner's return-to-volatility measure), the same trend persisted, i.e. low P/E portfolios outperformed high P/E portfolios.

A series of tests were conducted to assess the statistical significance of the portfolio return differentials. The initial test was designed to measure the significance of the difference between the risk-adjusted returns of quintile 1 (low P/E's) and quintile 5 (high P/E's). For each of the industries, a Z value was calculated, measuring the extent to which returns differ in quintile 1 versus quintile 5. Table 2 presents the Z value and the corresponding level of significance for each industry. In each case the difference of returns between the two P/E portfolios is significant at the .01 level -- thus substantiating the contention that returns on low P/E stocks in the electronics, paper/container, and food industries exceed the returns of high ratio securities.

Table 2

RESULTS OF TWO SAMPLE TESTS  
QUINTILE 1 VERSUS QUINTILE 5

<u>Industry</u>	<u>Z Value</u>	<u>Level of Significance</u>
Electronics	4.0	.01
Paper/Container	3.2	.01
Food	3.8	.01

Next, tests were performed to gauge the difference between each industry's mean return versus the industry's low and high P/E quintiles, respectively. Table 3 reveals that quintile 1 returns are higher than their industry mean at an .02 significance level or better. On the other hand, the returns of quintile 5 were significantly (.02 level or better) lower than the respective industry mean return. These results suggest that, for the selected industry samples, high ratio stocks not only significantly underperform their low P/E counterparts, but they also perform poorly when compared to the industry average return. At the same time, low P/E portfolios appear to generate higher returns than either high P/E or industry average portfolios.

TABLE 3  
RESULTS OF ONE SAMPLE TESTS  
SELECTED QUINTILES VERSUS INDUSTRY MEAN

<u>Industry</u>	<u>Quintile 1</u>		<u>Quintile 5</u>	
	<u>Z</u>	<u>Significance</u>	<u>Z</u>	<u>Significance</u>
Electronics	2.4	.01	3.6	.01
Paper/Container	2.4	.01	2.1	.02
Food	2.3	.02	3.0	.01

The final set of tests were designed to examine the significance of the quintile classification scheme as a whole. First, a nonparametric Chi-Square test for K independent samples was used. The calculated Chi-Square statistic for each industry indicates that the mean quarterly returns differ significantly (.02 level or better) among the P/E quintiles. Table 4 displays these results.

TABLE 4  
RESULTS OF CHI-SQUARE TEST FOR K INDEPENDENT SAMPLES  
QUINTILES 1 - 5

<u>Industry</u>	<u><math>\chi^2</math></u>	<u>Significance</u>
Electronics	30.0	.02
Paper/Container	37.0	.01
Food	39.3	.01

Also, a parametric one-way analysis of variance test is used to check the significance of the return differences for each of the three industries. The calculated F-statistic and corresponding significance level (Table 5) confirms the findings of the Chi-Square test -- there is significant return differences (.01 level) among the quintiles for each industry. These statistical results reinforce the contention that portfolio returns vary inversely with the magnitude of the portfolio's average P/E ratio.

Table 5

RESULTS OF ONE-WAY ANALYSIS OF VARIANCE  
 QUINTILES 1 - 5

<u>Industry</u>	<u>F</u> <u>Value</u>	<u>Significance</u>
Electronics	5.9	.01
Paper/Container	3.7	.01
Food	4.8	.01

CONCLUSIONS

The purpose of this study was to test the validity of the P/E ratio as a predictor of security returns. An attempt was made to control for three potential sources of return bias: small firm size, infrequent trading, and industry effect. The results of every statistical test performed indicated that the P/E ratio is, in fact, a significant factor related to security returns. Low P/E industry portfolios tend to outperform high ratio portfolios as well as the industry mean. Furthermore, as the ratio increases, the returns decrease monotonically. The results of the study suggest that excess industry returns can be achieved by adhering to a low P/E strategy, thus inferring that the one period CAPM may be an inadequate description of the behavior of capital markets.

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## Appendix A

## Electronics

PERIOD	BUY DATE	SELL DATE	GROUP ONE	GROUP TWO	GROUP THREE	GROUP FOUR	GROUP FIVE
1	69/12	70/ 3	-1.54	5.48	3.59	-8.74	3.55
2	70/ 3	70/ 6	-22.41	-26.03	-31.41	-29.91	-25.96
3	70/ 6	70/ 9	39.48	26.95	25.95	14.02	16.59
4	70/ 9	70/12	4.42	3.79	7.66	4.72	.68
5	70/12	71/ 3	18.68	25.36	20.63	28.84	21.54
6	71/ 3	71/ 6	4.67	.51	8.50	4.77	5.04
7	71/ 6	71/ 9	5.00	-6.38	4.86	-1.67	-.99
8	71/ 9	71/12	10.87	8.82	5.49	3.68	3.41
9	71/12	72/ 3	18.02	17.66	18.94	13.57	15.96
10	72/ 3	72/ 6	1.21	6.45	6.92	10.42	8.48
11	72/ 6	72/ 9	-.14	-.64	-4.87	-6.46	.90
12	72/ 9	72/12	12.98	.88	4.02	15.31	-3.48
13	72/12	73/ 3	-17.36	-20.24	-20.81	-9.41	-10.85
14	73/ 3	73/ 6	-16.30	-15.00	-12.02	-6.66	-12.32
15	73/ 6	73/ 9	24.04	32.76	17.69	32.98	31.71
16	73/ 9	73/12	-24.48	-25.63	-25.29	-10.83	-8.15
17	73/12	74/ 3	19.48	12.86	9.55	-5.95	-8.83
18	74/ 3	74/ 6	-6.94	-16.20	-17.40	-12.98	-3.66
19	74/ 6	74/ 9	-16.26	-15.32	-30.66	-29.78	-35.14
20	74/ 9	74/12	6.58	-.65	8.37	3.38	-4.93
21	74/12	75/ 3	61.39	63.94	52.62	40.40	46.76
22	75/ 3	75/ 6	28.01	27.93	28.53	17.06	17.15
23	75/ 6	75/ 9	-12.00	-3.94	-14.19	-18.48	-14.73
24	75/ 9	75/12	6.56	5.27	7.90	4.10	-.21



PERIOD	BUY DATE	SELL DATE	GROUP ONE	GROUP TWO	GROUP THREE	GROUP FOUR	GROUP FIVE
25	75/12	76/ 3	66.15	29.36	29.37	23.78	17.70
26	76/ 3	76/ 6	6.38	5.27	3.03	3.46	3.79
27	76/ 6	76/ 9	7.03	-.41	-4.78	-4.47	-8.65
28	76/ 9	76/12	23.21	5.16	7.09	6.05	-3.44
29	76/12	77/ 3	21.16	1.18	.90	-3.08	-12.86
30	77/ 3	77/ 6	10.63	12.13	10.74	5.35	5.25
31	77/ 6	77/ 9	-7.16	-.03	1.89	-8.78	-5.67
32	77/ 9	77/12	2.20	1.05	9.46	1.47	2.77
33	77/12	78/ 3	3.14	5.47	1.62	-5.68	-2.49
34	78/ 3	78/ 6	11.81	18.95	12.08	19.24	15.41
35	78/ 6	78/ 9	6.32	4.48	5.76	8.46	7.89
36	78/ 9	78/12	-9.19	-16.30	-8.65	-3.33	-10.73
37	78/12	79/ 3	34.42	12.21	16.97	10.81	10.26
38	79/ 3	79/ 6	8.47	.67	3.39	-2.13	1.93
39	79/ 6	79/ 9	10.61	11.73	11.33	9.78	6.56
40	79/ 9	79/12	5.69	.89	2.69	4.17	5.03
41	79/12	80/ 3	-6.59	-13.46	-9.15	-14.92	-5.11
42	80/ 3	80/ 6	20.18	10.68	13.76	3.60	7.85
AVERAGE PERIOD RETURN			8.53	4.71	4.33	2.53	1.86
AVERAGE ANNUAL RETURN			34.13	18.82	17.34	10.11	7.43

## Appendix B

## Paper

PERIOD	BUY DATE	SELL DATE	GROUP ONE	GROUP TWO	GROUP THREE	GROUP FOUR	GROUP FIVE
1	69/12	70/ 3	-2.69	-8.16	-.79	-4.15	-4.02
2	70/ 3	70/ 6	-25.15	-24.15	-20.54	-22.19	-23.12
3	70/ 6	70/ 9	26.55	16.71	18.74	19.37	15.33
4	70/ 9	70/12	16.27	4.62	6.63	3.20	4.62
5	70/12	71/ 3	22.03	10.12	14.98	20.65	9.74
6	71/ 3	71/ 6	-3.94	-5.63	1.79	-5.49	-3.40
7	71/ 6	71/ 9	-10.78	-9.79	-2.44	-8.40	1.27
8	71/ 9	71/12	-5.87	4.97	3.69	2.29	-2.33
9	71/12	72/ 3	7.26	6.03	14.13	4.69	1.02
10	72/ 3	72/ 6	-5.35	-2.63	2.15	-5.97	2.46
11	72/ 6	72/ 9	-.25	-7.16	-1.07	-1.65	-.25
12	72/ 9	72/12	6.37	2.05	14.74	13.82	8.60
13	72/12	73/ 3	-14.39	-9.76	-12.71	-14.68	-8.73
14	73/ 3	73/ 6	-17.86	-7.72	-14.34	-5.82	-4.63
15	73/ 6	73/ 9	27.26	19.78	22.53	32.04	18.41
16	73/ 9	73/12	-17.12	-22.84	-18.20	-10.49	-13.87
17	73/12	74/ 3	23.77	11.91	12.76	12.78	4.76
18	74/ 3	74/ 6	-10.43	-7.67	-4.97	-10.96	-6.94
19	74/ 6	74/ 9	-11.94	-15.84	-13.82	-22.71	-30.09
20	74/ 9	74/12	5.29	-4.32	7.84	6.80	-2.55
21	74/12	75/ 3	37.80	34.31	32.18	22.47	32.80
22	75/ 3	75/ 6	11.09	23.82	21.26	6.11	14.81
23	75/ 6	75/ 9	-6.97	-5.42	-1.53	-5.44	-14.78
24	75/ 9	75/12	13.49	20.40	15.51	6.71	13.75

PERIOD	BUY DATE	SELL DATE	GROUP ONE	GROUP TWO	GROUP THREE	GROUP FOUR	GROUP FIVE
25	75/12	76/ 3	50.39	41.12	31.38	28.48	26.40
26	76/ 3	76/ 6	6.47	4.00	-1.51	.26	-8.87
27	76/ 6	76/ 9	3.88	2.38	-5.09	-3.67	-2.47
28	76/ 9	76/12	3.88	9.35	7.90	11.15	9.58
29	76/12	77/ 3	-2.76	3.05	-1.97	-4.72	-9.98
30	77/ 3	77/ 6	7.15	4.56	5.86	-5.63	-6.96
31	77/ 6	77/ 9	1.13	-8.50	-4.32	-12.15	-8.74
32	77/ 9	77/12	12.87	5.14	-.01	2.42	1.51
33	77/12	78/ 3	.47	-1.21	-2.54	-4.33	-7.05
34	78/ 3	78/ 6	12.61	20.21	6.72	16.25	13.08
35	78/ 6	78/ 9	22.87	10.43	16.61	10.10	16.30
36	78/ 9	78/12	-9.72	-14.20	-5.93	-11.76	-18.37
37	78/12	79/ 3	22.23	32.35	16.38	28.38	16.18
38	79/ 3	79/ 6	6.03	-1.62	5.36	-1.90	.18
39	79/ 6	79/ 9	10.95	3.89	11.43	8.16	2.57
40	79/ 9	79/12	-2.75	-7.49	-7.21	-5.39	-4.74
41	79/12	80/ 3	-1.20	-3.95	-7.79	-13.15	-12.77
42	80/ 3	80/ 6	11.88	15.07	13.09	17.22	16.28
AVERAGE PERIOD RETURN			5.26	3.29	4.21	2.21	.83
AVERAGE ANNUAL RETURN			21.03	13.16	16.84	8.83	3.33
COMPOUND BEGINS 69/12			17.80	9.65	14.70	5.57	.03
COMPOUND BEGINS 70/ 3			18.58	10.82	15.18	6.15	.43
COMPOUND BEGINS 70/ 6			22.59	14.22	18.27	9.01	3.11

## Appendix C

## Food

PERIOD	BUY DATE	SELL DATE	GROUP ONE	GROUP TWO	GROUP THREE	GROUP FOUR	GROUP FIVE
1	69/12	70/ 3	3.73	-8.48	1.14	2.84	.41
2	70/ 3	70/ 6	-15.22	-21.30	-22.17	-19.86	-22.71
3	70/ 6	70/ 9	13.22	13.52	13.76	9.85	11.79
4	70/ 9	70/12	10.21	22.56	8.40	15.72	13.29
5	70/12	71/ 3	34.56	37.22	11.35	7.39	14.42
6	71/ 3	71/ 6	-7.05	1.71	-2.27	1.21	-9.20
7	71/ 6	71/ 9	2.76	-.93	-.81	-1.55	-4.44
8	71/ 9	71/12	-3.55	3.88	3.77	5.95	-3.43
9	71/12	72/ 3	4.99	-1.69	11.84	-.77	14.93
10	72/ 3	72/ 6	-3.42	-6.52	-7.16	-6.64	6.63
11	72/ 6	72/ 9	7.31	2.37	-3.45	-.42	-.55
12	72/ 9	72/12	9.43	6.07	8.76	9.13	18.03
13	72/12	73/ 3	-11.82	-3.69	-19.34	-9.81	-10.37
14	73/ 3	73/ 6	-15.71	-4.46	-16.20	-19.50	-15.34
15	73/ 6	73/ 9	20.49	11.54	16.71	14.18	12.89
16	73/ 9	73/12	-8.32	-19.04	-23.63	-14.14	-17.70
17	73/12	74/ 3	19.01	14.48	15.09	1.51	.08
18	74/ 3	74/ 6	-13.87	-19.18	-11.69	-14.89	-4.74
19	74/ 6	74/ 9	-14.70	-22.14	-22.77	-28.47	-37.29
20	74/ 9	74/12	23.25	16.31	14.32	18.70	27.82
21	74/12	75/ 3	33.62	46.66	58.11	36.06	18.62
22	75/ 3	75/ 6	30.56	22.26	14.18	13.58	10.38
23	75/ 6	75/ 9	-1.31	1.43	-8.48	-11.25	-7.39
24	75/ 9	75/12	16.95	19.94	20.71	16.43	12.01

PERIOD	BUY DATE	SELL DATE	GROUP ONE	GROUP TWO	GROUP THREE	GROUP FOUR	GROUP FIVE
25	75/12	76/ 3	24.65	8.16	4.63	-2.05	1.57
26	76/ 3	76/ 6	3.58	5.27	9.30	1.07	10.14
27	76/ 6	76/ 9	-6.09	-.50	8.74	3.82	-4.28
28	76/ 9	76/12	9.84	16.37	6.27	7.15	5.55
29	76/12	77/ 3	-3.64	1.09	.13	-5.37	-9.58
30	77/ 3	77/ 6	14.74	-.94	9.27	4.27	2.96
31	77/ 6	77/ 9	1.35	3.69	.15	2.98	-3.86
32	77/ 9	77/12	9.87	1.17	-2.80	-2.08	-6.62
33	77/12	78/ 3	5.49	-1.67	-3.82	-14.20	-4.94
34	78/ 3	78/ 6	19.23	11.32	14.83	14.01	9.72
35	78/ 6	78/ 9	5.53	8.25	6.23	5.38	-4.05
36	78/ 9	78/12	-4.70	-10.72	-9.17	-15.34	-13.76
37	78/12	79/ 3	12.21	.35	4.06	.44	5.54
38	79/ 3	79/ 6	7.76	1.78	5.33	-.65	9.35
39	79/ 6	79/ 9	11.85	12.63	6.75	3.87	-1.45
40	79/ 9	79/12	-1.92	1.03	-4.13	-2.05	.64
41	79/12	80/ 3	-15.48	-19.97	-20.15	-14.09	-9.52
42	80/ 3	80/ 6	21.52	23.39	28.81	24.98	14.25
AVERAGE PERIOD RETURN			5.97	4.12	2.97	.89	.71
AVERAGE ANNUAL RETURN			23.90	16.50	11.87	3.55	2.84

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