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Relationship between Price-Earning Ratios and Expected Return of Common Stocks: The Case of Malaysia

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ABSTRAK

Kertas ini menyelidiki perhubungan di antara nisbah harga/perolehan bagi sesuatu saham dan pulangan dijangkannya. Kolerasi pangkat Spearman, iaitu satu ujian bukan parametrik, digunakan untuk menguji perhubungan ini. Kajian ini mendapati bahawa perhubungan yang ketara didapati di antara dua pembolehubah di atas bagi keseluruhan tempoh masa 1980 hingga 1989 dan juga untuk subtempoh 1980 hingga 1984, yang mana ini menyarankan bahawa pasaran bagi saham-saham Malaysia adalah tidak cekap dari segi hipotesis pasaran cekap bentuk separa kuat. Walau bagaimanapun, bagi subtempoh 1985 hingga 1989 hubungan yang didapati adalah tidak ketara.

ABSTRACT

This paper investigates the relationship between P/E ratio of a stock and its expected return. Spearman rank correlation, a nonparametric test, was used to test this relationship. This study found significant relationship between the two for the entire period 1980 to 1989 and for the sub-period 1980 to1984, which suggest that the market for Malaysia stocks is not efficient in the semi-strong form of the efficient market hypothesis (EMH). However, for the sub-period 1985 to 1989, the relationship is not significant.

INTRODUCTION

In the semi-strong version of the efficient market hypothesis all past information is contended to be already reflected in stock prices. Advocates of this version of the efficient market hypothesis assert that past information is of no assistance in making future predictions of price performance. In other words, an investor cannot make above-normal profits from predictions of future stock price changes based on past information (Fama 1970; Fielitz 1974). While there is a substantial empirical evidence which support the hypothesis, some still question its validity (Williamson 1970; Basu 1977). Williamson (1970) for example,

found that low P/E stocks tend to outperform high P/E stocks. In addition, a study by Basu (1977) found that the low P/E stocks seem to have, on the average, earned higher return than the high P/E stocks. These findings, undoubtedly, are in contradiction to the strict sense of the semi-strong form of the efficient market hypothesis.

This paper will attempt to determine if there is a significant relationship between the return on a given stock and its P/E ratio for a sample of Malaysian stocks. If the semi-strong form of the efficient market hypothesis is valid then there will be no relationship between the return on a stock and its P/E ratio whether low or high.

The findings of this study will provide an additional evidence to substantiate either Basu's claim or the claim of the efficient market hypothesis. If Basu's claim is true, then this study will show a significant relationship between returns and P/E ratios. This will mean that an investor will be better off investing in a low P/E stock than investing in a high P/E stock as suggested by the findings of Basu's study

It should be noted that return here refers to the average monthly return of a given stock for the last 10 years. In a way, an average past returns reflect the expected return in the future. That is, this will show whether there is a relationship between the expected return of a stock and its classification in the high or low P/E stocks.

It should be explained here why a 10 years average return is used as a proxy for the expected future return. Markowitz (1952) mentioned about difficulty in finding the "correct" value for the expected return because it involves some statistical computations (more accurately, some probabilities regarding possible future returns which are very difficult to estimate). However, he suggested that a tentative or reasonable value for the expected return can be found using the observed returns for some period to be used; he suggested the use of the judgement of the practical men, though). Haugen (1986) suggested that the expected rate of return can be estimated using the sample mean (or the average) of the returns. He also mentioned that we would expect the accuracy of the estimate to increase as time increases, i.e., with the size of a longer period of time, we may get a better estimate of the expected return. However, we should keep in mind that the assumption is, the underlying probability distribution does not change its shape as time goes by. This assumption becomes more and more unrealistic the longer the period over which we take the sample. Therefore, the sample estimate should be taken for as long a period for which we are confident there has not been a significant change in the shape of the underlying distribution. Most investment advisory services (See Hirt and Block 1986, for samples of these services) provided data on a given stock for the most recent years (most commonly for the last 10 years). Data beyond 10 years are not that revelent for investment purposes from an investor's point of view. The 10 year average return is used as a proxy for the expected return based on the discussion above.

DATA BASE

The data consists of 15 stocks classified as having low P/E ratios and 15 stocks of high P/E ratios as reported by Investors Digest (a popular investment magazine in Malaysia published by the Kuala Lumpur Stock Exchange). Low P/E stock are stocks with P/E less than 20, and high P/E stocks with P/E more than 20. In addition, stocks chosen for this study are based on the availability of data on the reported change in the monthly percentage returns for the last ten years (a period from 1980 to 1989). Fifteen stocks from each low and high P/E ratios which meet these two requirements are chosen randomly. These stocks are then ranked in terms of their P/E ratios and their expected return.

METHODOLOGY

The stocks from the low P/E ratios and the stocks from the high P/E ratios are combined together. They are then ranked in this manner: (1) the stock with the lowest P/E ratio is assigned a ranking of 30 in the P/E ranking, the stock with the highest P/E is assigned ranking of 1, and the rest of the stocks are assigned accordingly; (2) the stock with the lowest return is assigned a ranking of 1, the stock with the highest return is assigned a ranking of 30, and the rest of the stocks are assigned accordingly; and (3) in the case of a tie, the rankings are averaged out and the stocks involved are assigned the same ranking.

In this study, the Spearman rank correlation test is used to determine if there is a significant relationship between the return ranking and the P/E ranking. If the return ranking is independent of the P/E ranking, that means there is no significant relationship between the earnings of a stock and its P/E ratio.

In a test involving stocks' returns it is better to use a nonparametric test (Spearman rank correlation is an example) because it assumes that the distribution of the data used in the test is not important; the results of the test is still valid regardless to the distribution of the data used. A nonparametric test makes no assumption regarding the distribution of the data (Miller 1981). This idea is important because as shown by Fama (1965), stocks' returns are not normally distributed. Therefore, a measure like Pearson correlation, is not suitable to be used to test the relationship between stocks' returns and their P/E ratios because of its assumption of normality regarding the data under study.

The Spearman rank correlation coefficient (Enns 1985; Miller 1981) is calculated as follows:

$$r_s = 1 - \frac{6 \sum_{i=1}^{n} d_i^2}{n (n^2 - 1)}$$

where, r_s = the Spearman rank correlation coefficient
d_i = the difference between return ranking and P/E ranking
and, n = the number of stocks used in this study.

The null hypothesis which states that returns are independent of the P/E ratios is tested using the formula

$$\text{t-(observed)} = \frac{r_s}{[(1-r_s^2) / (n-2)]^{1/2}}$$

The null hypothesis will be "accepted" if t-(observed) is within plus or minus t-table value with n-2 degrees of freedom at the corresponding level of significance. The null hypothesis will be accepted if t-(observed) is within plus or minus 2.048 at the 5 percent level of significance, and within plus or minus 2.763 at the 1 percent level of significance with 28 degrees of freedom.

The data are grouped for the period 1980 to 1989, the sub-period 1980 to 1984, and the sub-period 1985 to 1989. The test is first performed on the data comprising a period from 1980 to 1989, followed by the test on those two sub-periods. The results of the entire period 1980 to 1989 are compared to the results of the two sub-periods in order to find out whether or not there exists some consistency or stability in the results.

FINDINGS

Table 1 shows the average P/E and the average monthly return according to periods. For the entire period of 1980 to 1989, the high P/E stocks have an average P/E of 27.7 with an average monthly return of 3.16 percent, whereas the low P/E stocks have an average P/E of 15 with an average monthly return of 1.44 percent. This means that, on the average, the high P/E stocks have higher returns than the low P/E stocks. For the sub-period 1980 to 1984, the high P/E stocks have an average P/E of also 27.7 with an average monthly return of 2.65 percent, whereas the low P/E stocks have an average P/E of 15 with an average monthly return of 0.99 percent. Again, high P/E stocks outperform low P/E stocks. For the sub-period 1985 to 1989, the high P/E

stock have an average P/E of 37 7 with an average monthly return of 2.32 percent, whereas, the low P/E stocks have an average P/E of 12.7 with an average monthly return of 1.89 percent. Here, we see that the high P/E stocks still outperform low P/E stocks.

Table 2 shows the results of the Spearman rank correlation test according to periods. For the entire period of 1980 to 1989, the Spearman rank correlation coefficient is -0.58787 with t-observed value of -3.85. This means that there is an high correlation between P/E and the expected return. Because of the way stocks are ranked, the negative value indicates that high P/E will result in high return. For the sub-period 1980 to 1984, the r_s is -0.61323 with t-observed of -4.11. This also means that a high P/E stock results in high return. For the sub-period 1985-1989, the r_s is 0.03036 with t-observed of 0.16. This means that the correlation is not significant, but the negative value of the correlation indicates that a high P/E stock will somewhat result in high return.

TABLE 1. Average P/E and average monthly return for high and low P/E stocks according to period

Period	Average P/E		Average Monthly Return	
	High P/E	Low P/E	High P/E	Low P/E
1980 to 1989	27.7	15.0	3.16%	1.44%
1980 to 1984	27.7	15.0	2.65	0.99
1985 to 1989	37.7	12.7	2.32	1.89

TABLE 2 Results of the Spearman Rank Correlation Test

Period	Spearman Rank Correlation	t-observed
1980 to 1989	-0.58787	-3.85
1980 to 1984	-0.61323	-4.11
1985 to 1989	-0.03036	-0.16

The rankings of the stocks according to their P/E ratios and their returns (on the average) for the period 1980 to 1989 are shown in Table 3. The rankings of the stocks for the two sub-periods are shown in Table 4 and Table 5.

CONCLUSION AND IMPLICATION

In this paper the Spearman rank correlation test was used to test Basu's contention that low P/E ratio stocks performed better than high P/E ratio stocks. Thirty stocks classified in the high and low P/E ratio were used in this

TABLE 3. Rankings for P/E and average monthly of stocks
Period 1980 to 1989

	P/E Ratio	P/E Ranking	Monthly Avg. Return %	Return Ranking	Difference
S.P Textile	47.31	1	3.46	25	-24
Sel. Properties	39.81	2	1.96	13	-11
UE (M)	35.29	3	3.32	23	-20
U.Cable	30.93	4	4.34	26	-22
Bri-Ame Tobacco	27.84	5	2.67	19	-14
Tong Meng	27.5	6	2.34	16	-10
U.Motor Works	26.61	7	2.89	21	-14
U. Oversea Land	26.45	8	5.59	28	-20
Tasek Cement	25	9.5	6.5	30	-20.5
IGB	25	9.5	2.61	18	- 8.5
ALCOM	24.53	11	1.52	10	1
Boustead	22.49	12	2.78	20	- 8
Carlsberg	21.89	13	3.49	26	-13
Prima	21.43	14	3.36	24	-10
NBT	20.69	15	0.93	6	9
NST	20.36	16	4.81	27	-11
Sime Darby	19.09	17	1.07	8	9
Genting	18.73	18	1.7	11	7
SMI	18.06	19	1.97	14	5
PMCW	16.89	20	1.8	12	8
CCM	16.53	21	0.36	1	20
M.Cement	16.18	22	2.41	17	5
Shell	15.81	23	1.8	12	11
Ajinomoto	13.94	24	0.72	3	21
Malayawata	13.56	25	2	15	10
Tan Chong	13	26	3.2	22	4
MTC	12.91	27	0.53	2	25
CC Bintang	12.49	28	0.81	5	23
Roxy	11.67	29	1.02	7	22
Berjaya	10.97	30	0.78	4	26

TABLE 4. Rankings for P/E and average monthly return of stocks
Sub-Period 1980 to 1984

	P/E Ratio	P/E Ranking	Monthly Avg. Return %	Return Ranking	Difference
S.P Textile	47.31	1	3.944	25	-24
Sel. Properties	39.81	2	2.726	19	-17
UE (M)	35.29	3	1.544	13	-10
U. Cable	30.93	4	4.244	26	-22
Bri-Ame Tobacco	27.84	5	3.822	24	-19
Tong Meng	27.5	6	1.182	11	-5
U. Motor Works	26.61	7	5.62	27	-20
U.Oversea Land	26.45	8	9.708	30	-22
Tasek Cement	25	9.5	8.414	29	-19.5
IGB	25	9.5	3.218	21	-11.5
Alcom	24.53	11	2.408	16	-5
Boustead	22.49	12	3.796	23	-11
Carlsberg	21.89	13	3.238	22	-9
Prima	21.43	14	2.686	18	-4
NBT	20.69	15	1.736	14	1
NST	20.36	16	7.288	28	-12
Sime Darby	19.09	17	-0.298	2	15
Genting	18.73	18	1.428	12	6
SMI	18.06	19	0.252	4	15
PMCW	16.89	20	1.164	10	10
CCM	16.53	21	-0.442	1	20
M.Cement	16.18	22	2.434	17	5
Shell	15.81	23	0.372	5	18
Ajinomoto	13.94	24	1.07	8	16
Malayawata	13.56	25	-0.104	3	22
Tan Chong	13	26	3.038	20	6
MTC	12.91	27	0.998	7	20
CC Bintang	12.49	28	0.906	6	22
Roxy	11.67	29	1.892	15	14
Berjaya	10.97	30	1.132	9	21

TABLE 5. Rankings for P/E and average monthly return of stocks
Sub-Period 1985 to 1989

	P/E Ratio	P/E Ranking	Monthly Avg. Return %	Return Ranking	Difference
UE (M)	-21.1	1	5.09	30	-29
Berjaya	-10	2	1.71	12	-10
Alcom	-1.3	3	0.72	7	-4
Tong Meng	102.7	4	0.49	6	-2
Malayawata	82.2	5	4.72	29	-24
S.P Textile	70.9	6	2.97	22	-16
U.Motors Works	52.7	7	4.28	27	-20
SMI	48.6	8	1.68	11	-3
Sime Darby	40.8	9	2.44	20	-11
Roxy	40.7	10	0.14	3.5	6.5
Ajinomoto	36.7	11	-0.41	2	9
Tasek Cement	25.7	12	4.59	29	-17
Boustead	22	13	1.77	13	0
MTC	18.2	14	0.40	5	9
NST	17.2	15	2.39	18	-3
CCM	17.1	16	2.08	16	0
U. Cable	15.7	17	-2.77	1	16
Bri-Ame Tobacco	14.7	18	1.51	10	8
Carlsberg	14.2	19	3.74	25	-6
Genting	14	20	2.03	15	5
IGB	13.6	21.5	2.01	14	7.5
Sel. Properties	13.6	21.5	1.18	8	13.5
PMCW	12.9	23	2.44	21	2
Prima	11.2	24	4.03	26	-2
Shell	10.7	25	2.34	17	8
U.Oversea Land	9.3	26.5	1.47	9	-17.5
CC Bintang	9.3	26.5	2.41	19	7.5
Tan Chong	8.4	28	3.35	23	5
M.Cement	8.1	29	3.39	24	5
NBT	7.6	30	0.14	3.5	26.5

study. In this study it is found that the expected performance of a given stock is dependent on its classification in the high or low P/E. Specifically, it seems that high P/E stocks will perform better than the low P/E stocks especially in the period between 1980 to 1984. This result is in contradiction with Basu's finding which concludes that low P/E stocks perform better than high P/E stocks. Anyway, this finding as well as Basu's finding is still in contradiction with the semi-strong form of the efficient market hypothesis. However, for the second sub-period (1985 to 1989), it seems that no significant correlation

exists between P/E and return, which means that it substantiates the already enormous amounts of evidence which support the semi-strong form of the efficient market hypothesis which says that all past information (including P/E ratio as in this case), is not helpful in determining the performance of a given stock. The implication is, an investor has an equal change of making money (or losing it) regardless of his investment in the low or high P/E stocks.

REFERENCES

Basu, A. 1977 (June). The investment performance of common stocks in relation to their P/E Ratios: A test of the efficient market hypothesis. *Journal of Finance* 32: 663-82.

Enns, P.G. 1985. *Business Statistics: Methods and Application.* Homewood, Illinois: Richard D. Irwins, Inc., 603-7.

Fama, E.F. 1965 (January). The behavior of stock market prices. *Journal of Business.* 34-105.

———. 1970 (May). Efficient capital markets: A review of theory and empirical work. *Journal of Finance*, 383-417

Fielitz, B.D. 1974 (March). The random walk model of stock market prices: A review. *The Walk Street Review of Books*, 1-31.

Haugen, R. 1986. *Modern Investment Theory.* Englewood Cliffs, New Jersey: Prentice - Hall, 30-51.

Hirt, F & Block, S. 1986. *Fundamentals of Investment Management*, 2nd ed. Homewood, Illnois: Irwin, 92-131.

Markowitz, H. 1952 (March). Portfolio selection. *Journal of Finance*, 77-91.

Miller, R. 1981. *Introductory Statistics for Business and Economics.* New York: St. Martin's Press, 400-4.

Nicholson, F 1968 (January-February). Price ratios in relation to investment results. *Financial Analysts Journal*, 105-9.

Ofer, A. R. 1975 (May). Investor's expectations of earnings growth, their accuracy and effects on the structure of realized rates of return. *Journal of Finance*, 509-23

Williamson, J.P 1970. *Investment: New Analytical Tecniques.* New York: Praeger.

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