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RE-EXAMINING THE EXISTENCE OF LOW PRICE-EARNINGS RATIO EFFECTS: A Descriptive Approach to the Case of Indonesian Stock Market

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From practical point of view, Price-Earnings (P/E) ratio is one of numerous important aspects to consider. Analysts, investors, and traders in stock markets use P/E ratio –together with other information- in analyzing the past performance, and predicting the future prospect of securities in the market. However, noting its importance, there are some significant disagreements among researchers regarding the ability of P/E ratio in providing "correct information" about the future return of company stocks. One of the topics under discussion is about the presence of so-called low P/E effect*, which hypothesizes that high P/E will be followed by low returns and low P/E will be followed by high returns.*

This study, by repeating partially Johnson et al. (1989) procedures, was trying to confirm the low P/E effect *hypothesis in Indonesian market. The study involved 267 stocks listed in Jakarta Stock Exchange in the sample frame and selected the period of 1994-2000 as the focus of analysis. The study also has an intention to investigate whether there was a structural change in return-P/E relationship from the pre-crisis period (1994-1996) to the crisis period (1998-2000).*

The procedure of analysis was divided into two sections. In the first section a descriptive macro (market) analysis was presented, to test the hypothesis at the market level. It started with an overview about the fluctuation and trend of market P/E ratios during the period of 1991-2000, and followed by investigating the relationship between market P/E and the following returns. A regression analysis was also performed to strengthen the analysis from statistical point of view. In the second section, analysis is more directed to the portfolio level where the portfolios were ranked according to their P/E ratios. The study was concluded with a main finding that does not support the low P/E effect *hypothesis.*

Keywords: low p/e effect; price-earning ratio

The ability of price-earnings (P/E) ratios in reflecting the benefits gained by investors have been explored, analyzed and discussed by many researchers as well as practitioners since decades ago. Among several questions addressed, the simplest —and the most important— one is whether the high P/E stocks provide high returns to the investors and *vice versa*. Yet, until nowadays, the common agreement has not been reached. Some analysts believe that high P/E ratio in the past is usually followed by slow growth in stock prices. This is one of the reasons why many investors pay great attention to the high P/E ratios in the U.S. stock market in mid to late nineties. However, the other group of analysts disagree and argue that history is no longer a true guide because fundamental changes in the economy have made stocks more attractive to investors. In other words, they justify a high P/E ratio (Shen 2000).

P/E ratio itself can be interpreted in many ways. Cragg and Malkiel (1982), and Litzenberger and Rao (1971), for instance, viewed P/E ratio as an indicator of earning growth. While, Ball (1978) interpreted P/E ratio as a measure of risk. Further, Boatsman and Baskin (1981), and Alford (1992) supported the interpretation given by Graham et al. (1962), mentioning that P/E ratio is a measure of earnings capitalization rate. This study, in essence, follows the definition of Basu (1977) and Jaffee et al. (1989), in which P/E ratio is defined as the indicator of stock misspricing.

In a study performed more than twenty years ago, Basu related the stocks' performance to their P/E ratios in his effort to test the efficient market hypothesis. His findings confirmed that returns provided by low P/E stocks were significantly higher than those of high P/E common stocks. These findings were then supported by a number of researchers around the time of Basu's research, such as Roll (1981), Banz (1981), Brown et al. (1983), Keim (1983), Reinganum (1983), Francis (1986), and Radcliff (1987). The phenomenon is then commonly known as "low P/E effect" (Klein and Rosenfeld 1991), even though it is not clear whether this effect is homogeneous across all stocks with low P/E or whether it can be addressed to a particular group of stocks.

On the other side, some other researchers have challenged the argument of "low P/E effect." Jones (1987) and Johnson et al. (1989) are among those who find the opposite results in their studies. Jones found that stocks with low P/E ratio produced significantly lower risk adjusted rates of return as compared to those following the Standard and Poor 500 or other investment strategies. Similarly, Johnson et al. (1989) found that low P/E ratio portfolios earned the lowest average monthly rates of return —even lower than the monthly risk-free rate.

Given the conflicting findings of those researchers, the main purpose of this study, in general, is to re-examine the ability of P/E ratio to explain the stock performance, as measured by stock return. In a more specific term, the study is intended to answer whether the "low P/E effect" is found in Indonesian stock market. It is also expected to show further the behavior of investors in an emerging market, where some fraction of the market players are not sophisticated. The study hypothesizes that the low P/E effect is found in Indonesian stock market.

The steps and procedures employed by Johnson et al. (1989) —who followed Basu's procedures— are partially applied in the study. Johnson et al. (1989) investigated the relationship between the investment performance of stocks and their P/E

ratios. They analyzed portfolio returns, risks, as well as performance indices after grouping the portfolio according to their P/E ratios.

Research Methodology

Analysis of the presence of low P/E effect is divided into two sections. The first part consists of a market analysis, which is a more macro scenario. Here we investigate the historical records of average market's P/E ratios, where the data are collected from the Jakarta Stock Exchange (JSX) monthly statistics, over the period of 1991-2000. For the purpose of the study, we calculate average market P/E ratios for every three months by using the following formula:

$$\text{Av (P/E)} = \sum_{t=1}^{3} (P/E)_t \; / \; 3 \text{..... (Eq. 1)}$$

where:

$(P/E)_t$ = Market P/E at month *t*

The "behavior" of average market's P/E is presented in Figure 1. In order to provide some explanations about the occurrence of low P/E effect in the market, we calculate average market returns for the three-month period following the recorded P/E. For instance, we calculate average market returns for April through June 1995 in order to detect whether they have any particular patterns following the January-March 1995 average P/E ratio. The results of the calculation procedure are presented in Table 1.

To provide supporting information we construct Figure 2, which consists of dots representing average market returns following the average P/E ratios. We also perform a regression analysis between the market average return following recorded P/E (as a dependent variable) and average market P/E ratio (as the independent variable). This analysis is expected to

Figure 1. **Average P/E Ratios of the Jakarta Stock Exchange, 1991-2000**

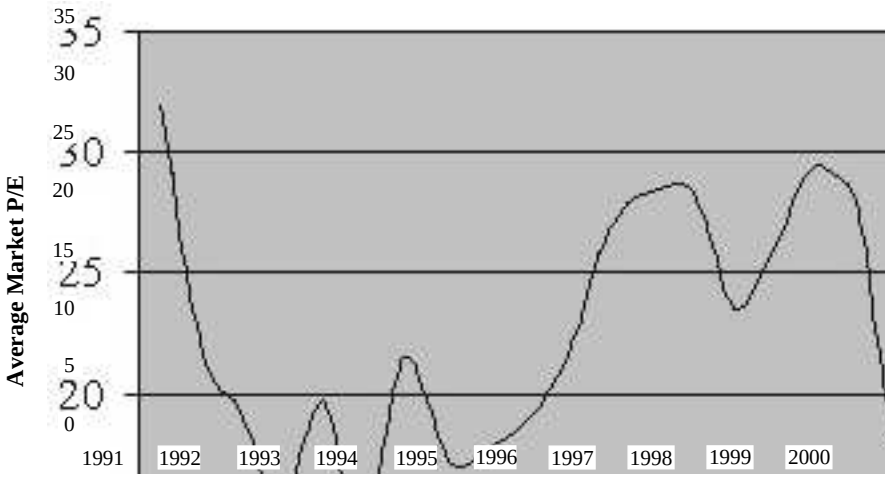


Table 1. **Average Market P/E Ratios and Average Market Returns**

Year	P/E Ratio	Return (%)	Year	P/E Ratio	Return (%)
1991a	21.90	-2.42	1996a	22.50	4.61
1991b	21.85	-0.71	1996b	17.25	0.58
1991c	19.13	-8.13	1996c	16.47	-0.94
1991d	15.48	-0.56	1996d	18.32	3.62
1992a	9.82	2.03	1997a	19.13	1.46
1992b	13.90	2.91	1997b	21.91	3.10
1992c	21.51	-3.40	1997c	17.43	-7.09
1992d	17.29	-3.10	1997d	12.12	-9.40
1993a	17.86	1.51	1998a	13.38	10.82
1993b	18.97	3.03	1998b	13.48	-5.86
1993c	21.77	4.87	1998c	4.55	-13.41
1993d	26.78	8.71	1998d	3.75	13.46
1994a	28.42	-4.27	1999a	3.21	-0.39
1994b	28.38	-3.71	1999b	4.10	19.13
1994c	23.48	-1.12	1999c	4.60	-6.08
1994d	26.17	-2.37	1999d	9.19	7.55
1995a	29.42	-2.86	2000a	13.68	-4.74
1995b	28.01	4.95	2000b	14.38	-3.35
1995c	18.46	0.10	2000c	6.08	-6.45
1995d	22.06	1.44	2000d	5.11	-0.30

[a] Average of 1st Quarter : January-March
[b] Average of 2nd Quarter : April-June
[c] Average of 3rd Quarter : July-September
[d] Average of 4th Quarter : October-December

strengthen our conclusion about the market reaction to P/E ratios.

The second part of analysis includes a more micro (portfolio) level. The study involves 267 stocks in the Jakarta Stock Exchange (JSX), without any intention to focus on some specific industries. Using 1997 as a "shifting year", namely the year when economic crisis started to hit capital market performance, the data are grouped into two three-year periods: Period I, namely the "pre-crisis period" (1994-1996) and Period II, the "crisis period" (1998-2000). Each of the periods is analyzed separately under hypothesis that some structural changes in investor behavior are detected.

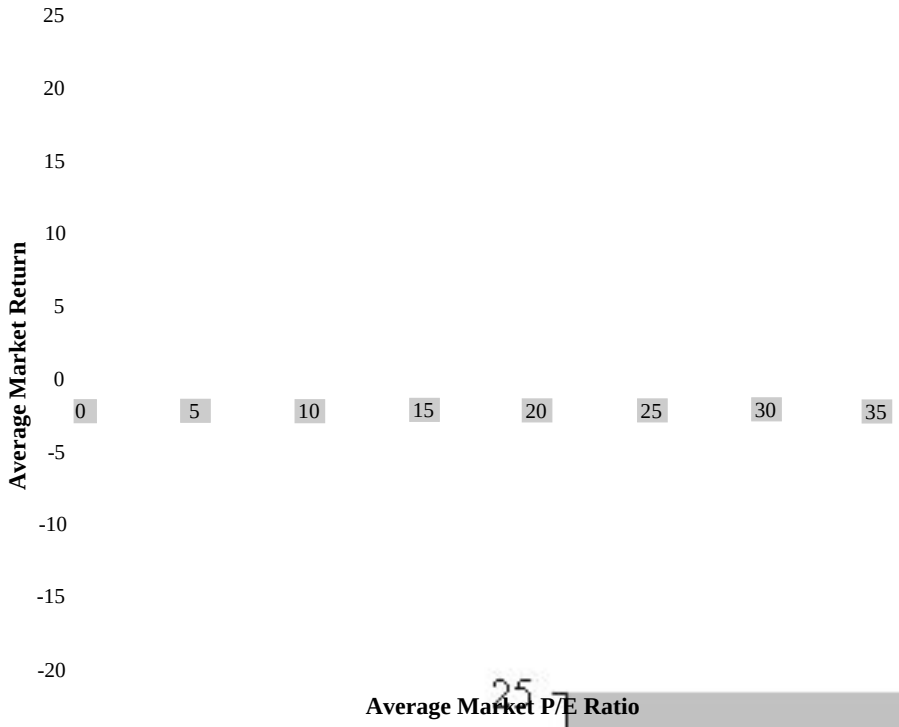
As a starting point, we array all stocks in the data set according to their P/E ratios for the year. P/E ratios are calculated by using the following formula:

$$P/E_{i,t} = PDec_{i,t} / EPS_{i,t} \quad \text{..... (Eq. 2)}$$

where:

$P/E_{i,t}$ = Price-earnings ratio of company *i* at year *t*

Figure 2. **Average Market Return vs. Market P/E Ratio**



$PDec_{i,t}$ = December closing price of company stock *i* at year *t*

$EPS_{i,t}$ = earnings per share of stock *i* at year *t*

After calculating the P/E ratios for all stocks, then we rank them from the lowest to the highest P/E. The highest P/E group might consist of stocks with negative earnings. Then, following (partly) Johnson et al. (1989), we form three equal-sized portfolios, starting from the lowest P/E portfolio. Thus, the third portfolio includes the companies with negative earnings. For more detail analysis, we construct another two portfolios. The fourth portfolio consists of high P/E stocks, excluding the negative earning companies. The last portfolio is the market portfolio. The performance of market portfolio is needed in the analysis for comparison purposes.

After constructing four portfolios, we calculate the January-to-January monthly returns for every stock for period I and for period II, respectively[1] . With an assumption of equal allocation weight for each stock then we calculated the portfolio rates of return. This procedure is repeated for every year, from 1994 to 1996 for period I,

[1] In his study, Basu (1977) calculated the monthly rates of return from April to April, with an argument that investors do not have access to company's financial statement and exact earnings figures at the end of December. However, Ball and Brown (1968) have shown that the market reacts as though it possesses such information (Johnson et al. 1989). Thus, following Johnson et al. 1989, we calculated the monthly returns from January to January.

Table 2. **Portfolio Returns, Standard Deviation, and Beta**

Portfolio*	Returns		Standard Dev. (σ)		Beta (β)	
	Period I (1994-1996)	Period II (1998-2000)	Period I (1994-1996)	Period II (1998-2000)	Period I (1994-1996)	Period II (1998-2000)
1	0.016	0.064	0.007	0.021	0.155	0.214
2	0.016	0.038	0.008	0.021	0.263	0.474
3	0.021	0.038	0.006	0.029	0.013	0.088
4	0.026	0.024	0.007	0.032	0.203	0.062
5	0.019	0.041	0.011	0.024		

*) 1 = lowest P/E portfolio
3 = highest P/E portfolio including the negative earning stocks
4 = highest P/E portfolio excluding the negative earning stocks, and
5 = market portfolio.

and from 1998 to 2000 for period II. The results of the procedure are the three years of average monthly returns data for each portfolio that appear in the return columns of Table 2.

Besides analyzing the monthly returns of each portfolio, in relation to their P/E ratios, there is an intention to explore the association between return and total risk (measured by σ) as well as the association between portfolio return and its systematic risk (measured by β).

Portfolio betas are calculated by estimating four equations using ordinary least squares (OLS), where we regress the monthly portfolio return against the monthly market return (Equation 3).

$$R_{Pi,t} = \alpha_P + \beta_P R_{Mi,t} \quad \text{..... (Eq. 3)}$$

where

$R_{Pi,t}$ = Return of i^{th} portfolio at time t (i = 1, 2,…, 4)

$R_{Mi,t}$ = Market return at time t

All of above figures —rates of returns, standard deviation, and beta of each portfolio— are then used as the basis for evaluating the portfolio performance.

Empirical Results

Market Performance Analysis

Fluctuation of P/E ratios in Jakarta Stock Exchange can be studied from Figure 1. The figure clearly shows that in general, P/E ratios were relatively higher in the beginning of 1990s, as compared to the ending part of the decade. At the beginning of 1991 market P/E ratio was about 30, which is considered relatively high by analysts. In the middle of 1996, for instance, the market P/E figure dropped to 22.5 and at the end of decade it became 6.1.

The P/E ratios' down sloping trend is logically explained by taking into account the interrelationship between capital market activities and the worsening of the country's economy and business condi-

tions. It is widely understood that regional economic turbulence, started in 1997, brings serious effects to Indonesian economy. Combined with country's political unrest, country's business risk becomes higher and investment opportunities tend to slow down. Business environment became unfavorable and, if not all, many businesses' profitability became lower in general. In turn, stock prices dropped even more significantly, which is indicated by some tremendous decreases in market composite index. By the end of 1998 market index (*Indeks Harga Saham Gabungan* or IHSG) became less than 400 as compared to around 600 in 1993.

The question of whether low P/E effect can be detected in Indonesian capital market as a whole can be answered primarily by studying the information provided by Table 1, which consists of market average P/E ratio and average market return for three months following the P/E. During the period of 1991, the P/E decreases from 21.90 to 21.85, 19.13, and finally to become 15.48 by the end of the year. However, the average returns for three months following the P/E do not show any particular pattern or direction.

Similar explanations can be given by other years during the observation period. During the year of 2000, for example, the P/E ratios form a decreasing pattern from 13.68 to 14.38, 6.08, and 5.11. If the low P/E effect is there, then the market return should have shown an increasing pattern during the same period of time. However, what we find instead, is a relatively randomized pattern of market return. Thus, the table technically shows that low P/E effect does not exist in Indonesian market. More specifically, a consistent pattern of relationship between P/E and return cannot be observed.

In the presence of low P/E effect, the dots in Figure 2 should form a down-sloping pattern of distribution. In other words, they are somehow concentrated in three extreme locations:

(1) The dots are concentrated in upper-left side of the graph if P/E ratios are low,
(2) The dots are concentrated in medium-center of the graph if P/E ratios are in medium size, and
(3) If the P/E ratios are high then the dots are concentrated in the lower right of the graph.

The actual distribution pattern presented in Figure 2 is far from showing the presence of low P/E effect since the dots are scattered almost randomly through out the graph.

To strengthen our descriptive analysis, a simple regression procedure between average market return (lag) and market P/E ratio using ordinary least square estimation provides the following results:

LAGRET =	0.038 –	0.274 MPER
t-stat	(1.642)	(-1.732)

..... (Eq. 4)

where:

LAGRET = Average monthly market return three months following P/E
MPER = Market P/E ratio

Actually, the negative regression coefficient is a "correct" sign for confirming the presence of low P/E effect in the market. The sign indicates that market return for three months following P/E decreases as P/E increases, or it increases as P/E decreases. However, the low value of t-statistics does not support the robustness of this negative relationship. So, from the

statistical point of view, we underline the fact that the low P/E effect is "not really there".

Portfolio Performance Analysis

As mentioned in the previous section, a more micro-portfolio analysis is undertaken in order to examine the presence of low P/E effect in a more detail form. In macro level, we have analyzed the market for the whole ten-year period. In this section, we intend to have a more focused attention to the six-year periods surrounding the "turning year" of 1997 and divide the period of analysis into two sub-periods; 1994-1996 and 1998-2000.

Examinations of the scores provided by Table 2 bring us to several conclusions regarding the matter in the selected portfolios in each period. The table consists of average returns gained by each portfolio that we have constructed and ranked from low to high P/E. Portfolio 1 is the lowest P/E portfolio and portfolio 5 is the market portfolio. Table 2 also prepares the values of portfolios' total risks (measured by s) and systematic risks (measured by b), so, following Basu (1977) and Johnson et al. (1989), we can examine again the association between return and risk for each portfolio.

When we focus our attention to period I, the pre-crisis period, it is quite apparent that the pattern supporting the low P/E portfolio hypothesis is not observed. Portfolio 1, the lowest P/E portfolio, provides monthly average return of 1.6 percent, which is not higher than those of other portfolios. In fact, this rate is less than the rates one would earn from the market (portfolio 5). Portfolio 2, which has a higher P/E than that of portfolio 1, instead of having lower return, only provides similar rates of return (1.6 percent). On the other hand, returns performed by portfolio 3 and 4 (which have higher P/E ratios, respectively) are significantly higher, which are also contradictory to the low P/E effect hypothesis.

In the second period, actually the existence of low P/E effect is "almost" observed. The first portfolio provides the highest return (6.4 percent) than the other portfolio returns. In turn, portfolio 4 provides the lowest return, which is only 2.4 percent. The performances of those two portfolios *per se* seem to support the hypothesis. However, instead of performing lower return, portfolio 3 performs a similar return to portfolio 2, namely 3.8 percent. Therefore, again, we cannot confirm presence of the low P/E effect for this period.

Further, lower return portfolios are not always associated with lower level of total risk (s) and systematic risk (b). In period I, more specifically, portfolio 2 (lowest return portfolio) has the largest standard deviation and beta of 0.008 and 0.263, respectively. By contrast, the highest return portfolio 4 does not possess a highest standard deviation and beta. In the second period, the highest return portfolio 1 (6.4 percent) is not accompanied by the largest standard deviation and beta (0.021 and 0.214, respectively) and the lowest return portfolio (portfolio 4) does not have the smallest standard deviation, even though it possesses the lowest beta. These results contradict with those reported by Basu and seem to be parallel to the findings of Johnson et al. (1989).

Conclusion

The study examines the behavior of the Indonesian stock market returns with respect to the P/E ratios by concentrating on the question of whether the low P/E effect exists in the market. In one side, the

topic remains relevant due to the fact that until nowadays, P/E ratio is still one of popular aspects considered by market players, no matter whether they follow technical or fundamental analysis. On the other side, the hypothesis of low P/E effect is still facing some ambiguities.

After conducting a two-level of analysis, macro and micro levels, we can conclude that the low P/E effect does not exist in Indonesian market. Using partially similar research procedures to that of Johnson et al. (1989), the study provides some results that confirming their findings even though the procedures are applied in a completely different type of market. Finally, the study does not detect any structural change in market return behavior towards the P/E ratio from "pre-crisis period" to "crisis period."

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