

P/E VERSUS PEG: WHICH BETTER PREDICTS ABNORMAL RETURN?

Gil Cohen

**The Max Stern Academic College of Emek Yezreel
Emek Yezreel 19300, Israel**

Abstract

In this study, we measured the relationship between the price multipliers of NASDAQ-100 stocks measured in May 2010 and abnormal returns of the same stocks during the following two months. Our aim was to examine how several well-known price multipliers, specifically trailing P/E, forward P/E and PEG, are related to abnormal return. We found that all three price multipliers failed to outperform the NASDAQ-100 index. That is, they cannot be used to shape a winning portfolio if the size of the firm is not taken into consideration. However, within a group of large market capitalization firms, relatively high forward P/E firms successfully outperformed the NASDAQ-100.

1. Introduction

Two main price-earning multipliers have been discussed in the financial literature. The pioneering work of Basu (1977) was the first to suggest that the market price of a stock divided by its earnings per share could be used to predict abnormal return. Basu's P/E ratio was based on past earnings and is commonly known as trailing P/E. More recent studies have identified the forward P/E and the PEG ratios as predictors of abnormal return. The forward P/E is calculated by dividing the stock price by the firm's projected future earnings over a period ranging from one year to several years. The PEG is calculated by dividing the trailing P/E by the projected short-term (one year) growth in earnings. These price multipliers serve as technical tools for investors and portfolio managers, where a low price multiplier in comparison to the sector's average may indicate a relatively high-expected return. The following study uses NASDAQ-100 stock data in order to examine the hypothesis that low price

multipliers point to future abnormal return.

2. Literature review

As mentioned above, Basu (1977) was the first major work to discuss the relations between trailing P/E and abnormal return. Basu questioned the efficient market hypothesis and showed that lower investment based on relatively low P/E produces abnormal return, regardless of firm size. Black (1980) argued that a P/E of 10 is "normal" and that investors should refer to this figure as their investment guideline. More recent studies have incorporated earning growth into the traditional trailing P/E, resulting in the forward P/E and the PEG ratios. Schipper (1991) examined the link between earnings forecasts and stock recommendations. Other studies have documented the relationship between market value and earnings forecasts (e.g., Givoly & Lakonishok, 1984). The PEG valuation model can be justified in terms of the dividend discount model (Ohlson & Juettner-

Nauroth, 2005; Easton et al., 2002). Lynch (2000), for example, argued that a stock is fairly priced and should be recommended by analysts if its PEG ratio is equal to one. A PEG ratio greater than one supports a sell recommendation. Bradshaw (2004, 2002) also discussed the merits of the PEG ratio and its useful investment applications.

3. Data and Methodologies

In the following study, we used data for all NASDAQ-100 stocks for the three-month period from May through July, 2010. Data were provided by Yahoo Finance (finance.yahoo.com/). First, we used the May data to calculate averages for the three price multipliers: trailing P/E, forward P/E and PEG. The data from June and July were used to calculate accumulated abnormal return, as follows:

$$AB\ Return = \sum_{i=1}^M R_i - RI_i$$

(1) where *AB Return* = access return of a specific stock over the index (NASDAQ-100), R_i = return of a specific stock in week *i*, and RI_i = return on the index at time *i*.

Next, we calculated correlations between the discussed price multipliers and the measured abnormal return for the entire sample. In order to check whether size is a factor that influences the examined correlations, we then grouped the sample stocks into four groups according to their market capitalization and reexamined correlation. Finally, we carried out simulation testing on eight constructed portfolios, each containing ten stocks traded with the higher/lower price

multipliers, and then compared the performance of these portfolios to the three-month accumulated return of the NASDAQ-100 index. Our aim is to examine whether, as predicted in theory, a low-price multiplier investment strategy produces abnormal returns.

4. Results

Table 1 shows that the average trailing P/E of NASDAQ-100 firms is 31.63, the forward P/E is 12.86 and the PEG is 1.42. The average market capitalization is \$23.66 billion¹. The data also indicate an average annual growth rate of 22.15% in the earnings projection of NASDAQ-100 firms. Moreover, as expected, the mean cumulative abnormal return of all 100 stocks on the index is approximately zero. In order to examine the relationships between the discussed price multipliers and accumulated return, we ran a Pearson correlation test. The results are summarized in Table 2.

Table 2 shows a significant correlation (at the 0.1 level) between a firm's market capitalization and its trailing P/E. This well-documented size effect means that large firms are traded with lower P/E than small firms. It is interesting to note that the relationship between the forward P/E and market capitalization is positive (approaching statistical significance) and that the P/E and the forward P/E are not correlated. The only price multiplier that was found to have a statistically significant correlation to the accumulated return was the trailing P/E.

¹The data are correct for the end of July 2010.

Table 1: Descriptive Statistics

	Mean	Std. Deviation	Maximum	Minimum
ABN return	0.099	12.17	38.03	-63.35
PE	31.63	22.66	122.47	9.42
Forward P/E	12.86	5.65	40.54	3.87
PEG	1.42822	0.99	7.23	.47
Mar Cap	23.66	42.31	245.02	2.58

Notes: 1. ABN return = percentage cumulative abnormal return.
 2. P/E=Trailing Price Earnings ratio.
 3. Mar Cap=market capitalization of the firm in \$billions.

Table 2: Correlation Matrix for the Entire Sample.

	ABN return	P/E	Forward P/E	PEG	Mar Cap
ABN return	1	0.18 (0.04)	0.068 (0.26)	0.017 (0.43)	-0.017 (0.43)
P/E	0.18 (0.04)	1	-0.05 (0.29)	0.21 (0.02)	-0.14 (0.08)
Forward P/E	0.068 (0.26)	-0.05 (0.29)	1	0.02 (0.49)	0.127 (0.12)
PEG	0.017 (0.43)	0.21 (0.02)	0.02 (0.49)	1	-0.80 (0.22)
Mar Cap	-0.017 (0.43)	-0.14 (0.08)	0.127 (0.12)	-0.80 (0.22)	1

Notes: 1. ABN return = percentage cumulative abnormal return.
 2. P/E = Trailing Price Earnings ratio
 3. Mar Cap =market capitalization of the firm in billions\$.
 4. Significance level at 0.1 level is marked in black.

Table 3: Abnormal Return and Price Multipliers by Group Size

Group	1	2	3	4
ABN return	1.08	-1.69	3.85	-2.68
P/E	32.85	28.96	37.68	27.28
Forward P/E	13.10	12.16	12.31	13.79
PEG	1.33	1.5	1.67	1.18
Mar Cap	4.80	7.31	12.37	67.45
N	22	23	23	24

Notes: 1. ABN return = Cumulative return in June-July 2010.
 2. Mar Cap= Market Capitalization in billion \$.
 3. P/E=Trailing P/E

Surprisingly, however, the correlation was positive and not as the theory states. According to financial theory, firms with a lower P/E should be correlated with higher abnormal return than firms with a high P/E. Our surprising result indicates that an investor or analyst can no longer rely on relatively low P/E to make recommendations to purchase a stock. Much has changed since Basu (1977). The relationship between past earnings and current stock price has been severed, especially in the high tech sector traded on the NASDAQ. Forward P/E and PEG were found to be unrelated to abnormal returns. In order to further investigate the impact of firm size on the relationship

between abnormal return and price multipliers, we split our sample into four approximately evenly sized groups according to firm market capitalization

As can be seen in Table 3, the stocks in Groups 1 and 3 achieved positive abnormal return, while those in Groups 2 and 4 showed negative abnormal return. These results indicate that for NASDAQ-100 stocks, there is no correlation between size and abnormal return (as was noted earlier). Moreover, larger stocks are traded with lower PEG. Repeating the Pearson correlation test for each group individually produces the following results:

Table 4A: Correlation Matrix for Group 1.

	ABN return	P/E	Forward P/E	PEG	Mar Cap
ABN return	1 (0.18)	0.20 (0.18)	-0.26 (0.06)	0.22 (0.15)	0.08 (0.35)
P/E	0.20 (0.18)	1	-0.01 (0.49)	0.11 (0.33)	0.28 (0.08)
Forward P/E	-0.26 (0.06)	-0.01 (0.49)	1	-0.03 (0.43)	-0.015 (0.49)
PEG	0.22 (0.15)	0.11 (0.33)	-0.03 (0.43)	1	0.01 (0.48)
Mar Cap	0.08 (0.35)	0.28 (0.08)	-0.015 (0.49)	0.01 (0.48)	1

Table 4B: Correlation Matrix for Group 2.

	ABN return	P/E	Forward P/E	PEG	Mar Cap
ABN return	1 (0.48)	-0.01 (0.48)	-0.00 (0.43)	-0.04 (0.42)	-0.08 (0.35)
P/E	-0.01 (0.48)	1	0.03 (0.43)	0.06 (0.37)	-0.04 (0.42)
Forward P/E	-0.00 (0.43)	0.03 (0.43)	1	-0.10 (0.31)	-0.30 (0.07)
PEG	-0.04 (0.42)	0.06 (0.37)	-0.10 (0.31)	1	0.21 (0.16)
Mar Cap	-0.08 (0.35)	-0.04 (0.42)	-0.30 (0.07)	0.21 (0.16)	1

Table 4C: Correlation Matrix for Group 3.

	ABN return	P/E	Forward P/E	PEG	Mar Cap
ABN return	1	0.39 (0.03)	0.28 (0.09)	-0.05 (0.41)	0.00 (0.48)
P/E	0.39 (0.03)	1	-0.15 (0.24)	0.37 (0.04)	0.26 (0.15)
Forward P/E	0.28 (0.09)	-0.15 (0.24)	1	-0.15 (0.24)	-0.34 (0.05)
PEG	-0.05 (0.41)	0.37 (0.04)	-0.15 (0.24)	1	-0.23 (0.14)
Mar Cap	0.00 (0.48)	0.26 (0.15)	-0.34 (0.05)	-0.23 (0.14)	1

Table 4D: Correlation Matrix for Group 4.

	ABN return	P/E	Forward P/E	PEG	Mar Cap
ABN return	1	0.13 (0.47)	0.28 (0.09)	0.10 (0.31)	0.13 (0.26)
P/E	0.13 (0.47)	1	-0.05 (0.40)	0.18 (0.19)	-0.26 (0.10)
Forward P/E	0.28 (0.09)	-0.05 (0.40)	1	0.10 (0.30)	0.14 (0.25)
PEG	0.10 (0.31)	0.18 (0.19)	0.10 (0.30)	1	0.04 (0.41)
Mar Cap	0.13 (0.26)	-0.26 (0.10)	0.14 (0.25)	0.04 (0.41)	1

- Notes: 1. ABN return = percentage cumulative abnormal return.
 2. P/E=Trailing Price Earnings Ratio.
 3. Mar Cap = market capitalization of the firm in billions\$.
 4. Significance level at 0.1 level is marked in black.

The results summarized in Tables 4A-4D are interesting: 1. The only group for which a statistically significant positive correlation was found between abnormal return and trailing P/E was Group 3, which includes mid-sized firms². 2. While the correlation between abnormal return and forward P/E was found to be negative for small firms, it changed signs to positive for mid- and large-sized firms. This result indicates that relatively small forward P/E can predict abnormal return only for small-sized firms, while large forward P/E has the same prediction power for mid-sized to large-sized firms. This change in the correlation

sign from negative for small firms to positive for larger firms can be explained by the known fact that the earnings of large firms are likely to grow at a slower rate than the earnings of smaller firms. 3. A positive correlation was found between trailing P/E and a firm's market capitalization for small firms (Group 1), while for large firms³ (Group 4) the correlation became negative. This result indicates that in a group of relatively small firms, larger firms are traded with larger trailing P/E because investors tend to buy stocks and elevate the prices of firms with positive earnings rather than buying stocks in firms that

² Average market capitalization of \$12.37

³ Average market capitalization of \$67.45 billion.

have not started yet to profit. In contrast, in the large market capitalization group of firms, the negative correlation between size and trailing P/E can be explained by the fact that large firms have higher earnings than smaller firms. 4. A negative correlation was found between size and forward P/E for mid-sized firms (Groups 2 and 3). In those size categories, earnings forecasts for larger firms are higher than those for smaller firms.

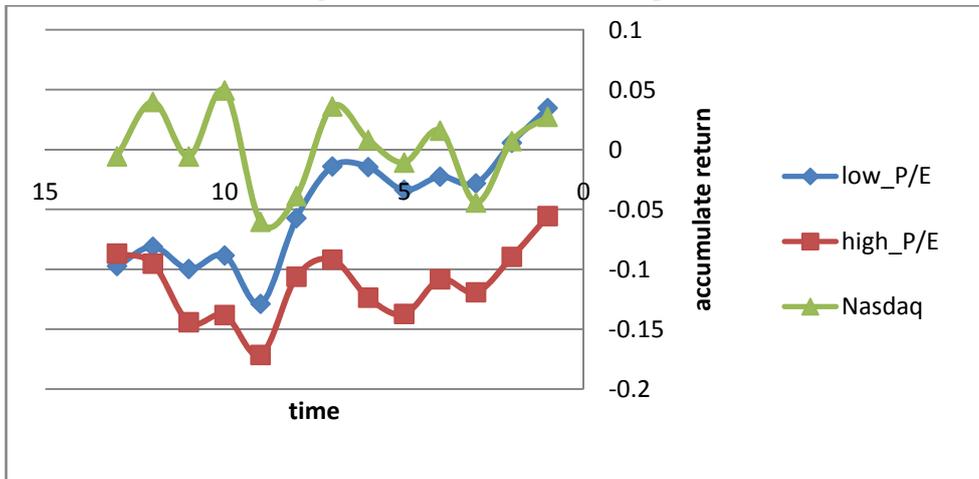
Next we ran twelve-week simulation tests (May to July 2010) by constructing six portfolios, two for each price multiplier. At all times, all the portfolios contained ten stocks that had been traded with the lowest/highest price multiplier in a specific week. We compared the weekly accumulated returns of those portfolios to the accumulated return of the NASDAQ-100 index during that same period. The results are shown in Graphs 1, 2 and 3. These graphs indicate that none of the constructed portfolios managed to outperform the NASDAQ-100 index.

Graph 1 demonstrates that both low and high trailing P/E portfolios achieved a negative accumulated return during the 12 weeks of the research period (-0.1 for the low P/E portfolio and -0.08 for the high P/E portfolio), while during that same period the NASDAQ-100 index was very slightly down, with accumulated return of -0.01. The graph also shows that except for one week, the NASDAQ-100 outperformed the trailing P/E-based portfolios. Graph 2 shows that the forward P/E constructed portfolios also failed to outperform the NASDAQ-100 index, though the high forward P/E portfolio did better than

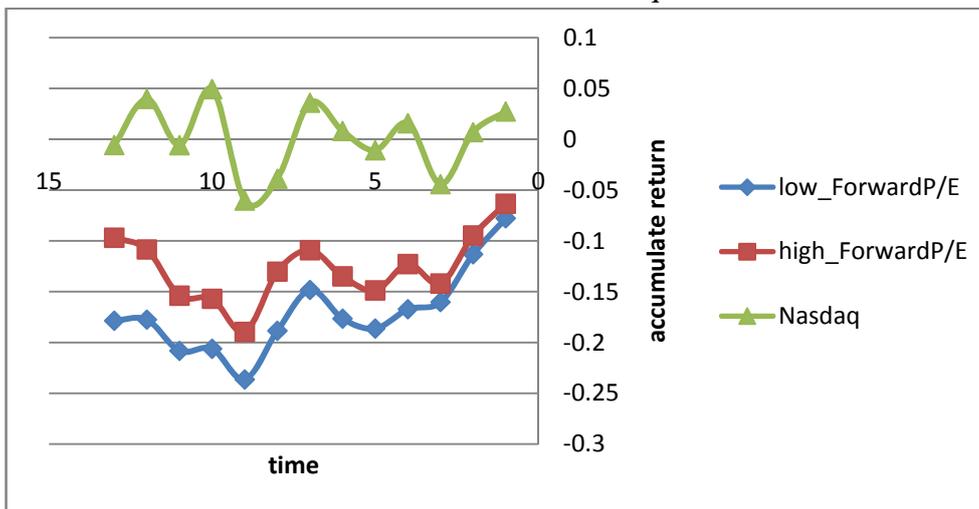
the low forward P/E portfolio (-0.1 for the high forward P/E portfolio and -0.18 for the low forward P/E portfolio). The constructed high/low forward P/E portfolios failed to outperform the NASDAQ-100 at all times. Similar results were found for the PEG ratio constructed portfolio (presented in Graph 3). Both high and low constructed portfolios failed to outperform the NASDAQ-100 index (-0.12 for the high PEG portfolio and -0.14 for the low PEG portfolio).

Since forward P/E has been found to be best correlated with abnormal return, we constructed two portfolios: 1. Ten stocks with the lowest forward P/E within Group 1, which corresponded to the negative correlation found between abnormal return and forward P/E within the relatively small firms. 2. Ten stocks with the highest P/E within Groups 3 and 4, which corresponded to the positive correlation found between abnormal return and forward P/E for relatively large firms. The procedure of changing the two portfolio ingredients every week was the same as described above. Portfolio number 1 failed to outperform the NASDAQ-100, as shown in Graph 4, while portfolio number 2 managed to outperform the NASDAQ-100, as shown in Graph 5. Of the eight simulations we conducted during the three-month research period, the only portfolio that successfully outperformed the NASDAQ-100 index was the one comprising ten stocks with relatively high forward P/E within the groups of high market capitalization firms. The portfolio achieved a positive accumulated return of 0.018, compared to -0.01 of the NASDAQ-100 index.

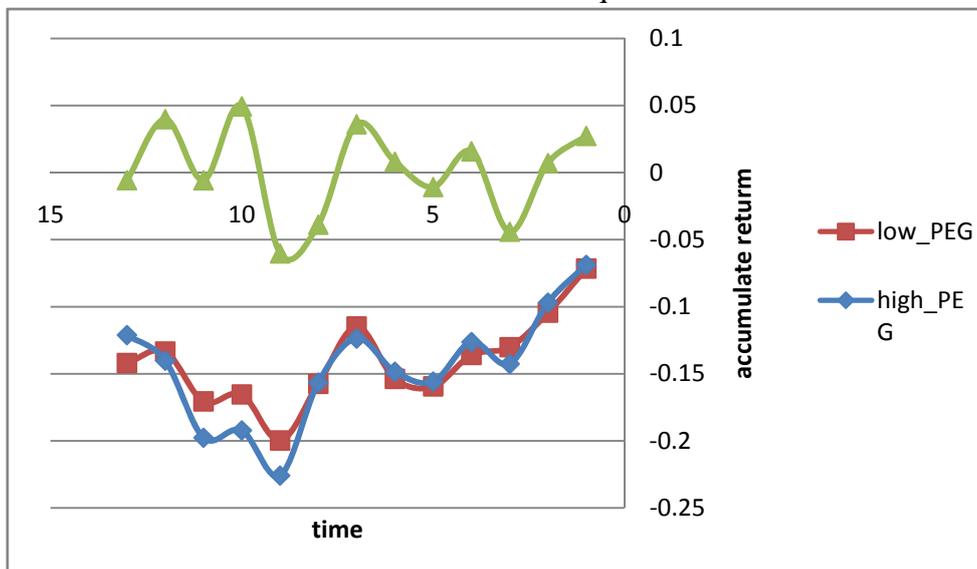
Graph 1: Accumulated Returns of High/Low Trailing PE Ratio and the Nasdaq100 Index



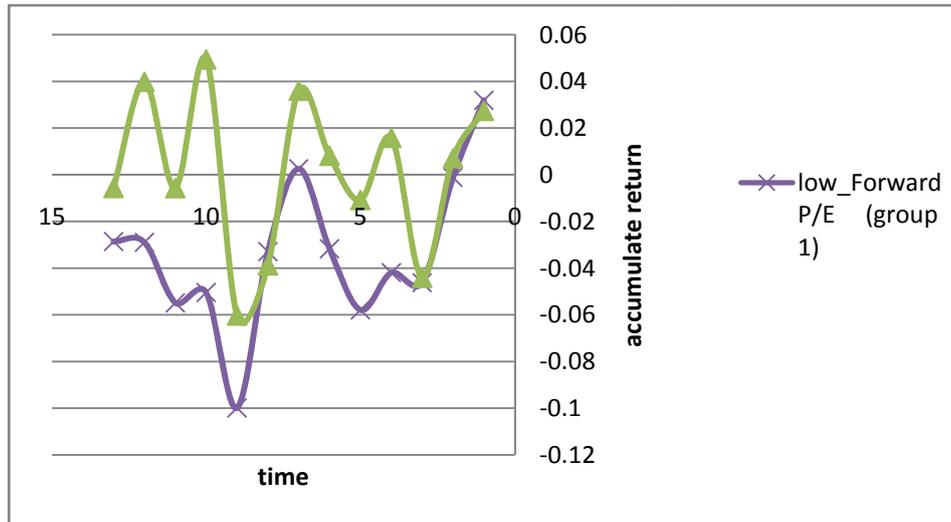
Graph 2: Accumulated Returns of High/Low Forward PE Ratio and the Nasdaq100 Index



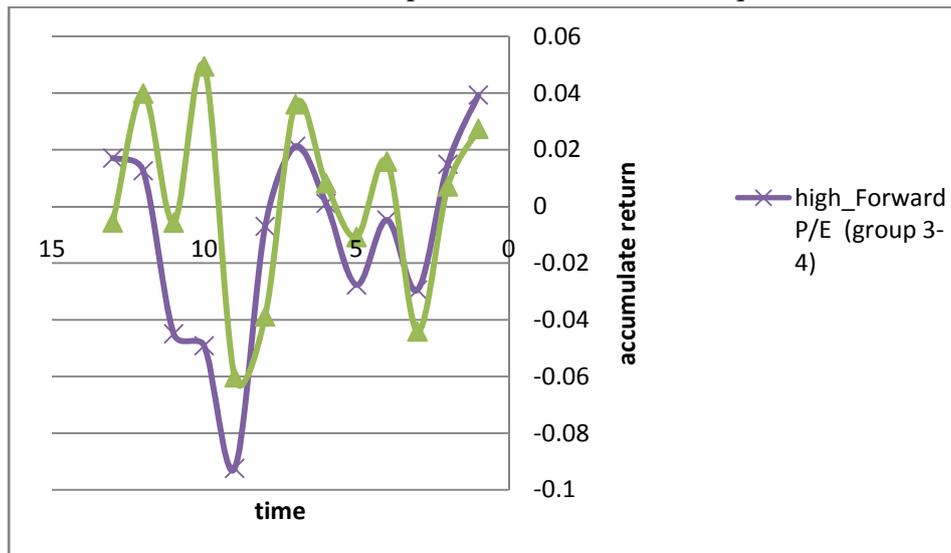
Graph 3: Accumulated Returns of High/Low PEG Ratio and the Nasdaq100 Index



Graph 4: Accumulated Returns of Low Forward PE Ratio Within Group 1 and the Nasdaq100 Index



Graph 5: Accumulated Returns of High Forward PE Ratio Within Groups 3 and 4 and the Nasdaq100 Index



5. Summary and conclusions

In this study, we examined the relationship between price multipliers of NASDAQ-100 stocks measured in May 2010 to abnormal return of the same stocks in the two following months. Our aim was to examine whether well-established arguments that relatively low price multipliers can outperform the market portfolio still hold today. We also examined the

relationship between more modern price multipliers (forward P/E and PEG) and accumulated abnormal return. To this end, we ran statistical tests followed by eight simulations. In general, we found that all three price multipliers failed to outperform the NASDAQ-100 index. This finding means that they cannot be used to shape a winning portfolio if size of the firm is not taken into consideration.

However, within the groups representing large market capitalization firms (3 and 4), relatively high forward P/E firms successfully outperformed the NASDAQ-100 in the examined period of time. To examine this further, we suggest dividing the sample according to industry and to Bull/Bear markets.

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