FACTOR DETERMINING PRICE-EARNINGS (P/E) RATIO

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Dengan semakin terintegrasi nya pasar modal, analisis faktor-faktor yang berpengaruh terhadap price earning ratio pada suatu industri menjadi sangat penting bagi investor sekitar mengenai suatu perusahaan investasi. Dengan informasi ini, investor yang tertarik akan meningkatkan suatu perusahaan investasi terhadap risiko yang berbeda antar industri. Informasi ini merupakan informasi yang penting dalam memilih kebijakan investasi yang paling manfaat akan memberikan kapital yang wajar, yakni kapital yang mencerminkan investasi potensial. Tujuan ini akan menyajikan pengujian empiris faktor-faktor yang mempengaruhi price earning ratio dengan menggunakan data perusahaan-perseroan Amerika yang dipublikasikan dalam dividend achieving. Dengan penelitian ini digunakan suatu variabel, yakni, penjualan, dividend, dividen peer ratio, aktiva tetap, leverage, return on equity, skala dan pertumbuhan laba. Hasil penelitian ini menunjukkan bahwa ketika variabel tersebut berpengaruh secara signifikan dan konsisten untuk keam industri yang berbeda.

Keywords: price earning ratio, ANOVA test

Introduction

Price earning (PE) ratio is part of the everyday vocabulary of stock market investors. Price earning ratio shows how much investors are willing to pay per dollar of reported profits, thus making it a very useful tool for instrument. By the same token, financial managers value the ratio if the firm’s stock sells at high P/E, since a high P/E shows that investors think that the firm has good growth opportunities (high PEGO) which in turn means its earning are relatively safe and merit a lower capitalization rate. Jones (1991) describes P/E ratio as one of the most interesting aspects for financial managers and analysts. He contends that an alternative fundamental analysis employed by security analysis is the P/E ratio or the earning multiplier approach. He states that although the conceptual framework for the P/E model is not as solely based on economic theory as the dividend discount model (DDM), a P/E ratio model is consistent with present value analysis because it is concerned with the intrinsic value of a stock or aggregate market. And it tells
investor the price being paid for each $1 of earnings. In his model, Jones (1991), derives the P/E ratio from the DDM model and concludes that only three factors theoretically affect estimates of the P/E ratio. They are: (a) the dividend payout ratio, (b) the required rate of return; and, (c) the expected growth rate of dividends. He states that other things being equal, the higher the payout ratio, the higher the P/E ratio; the higher the expected growth rate; and the higher the required rate of return, the lower the P/E ratio.

Looking at the five criteria suggested by Nicholas and James (1999), for selecting an investment vehicle, we have also to examine the factors that determine P/E ratio. For example, investment risk explains the chance that an investment and all its accumulated yield will be worthless at some future time. Another of the five criteria, yield, represents the increase in value of an investment over time, usually a year, while duration represents the length of time for which assets are committed. Liquidity shows how quickly one can get back invested funds on demand and lastly, tax consequences explain how investment will affect the investor’s tax situation.

Based on the above, some analysts such as Houghton (1992), feel that the dividend discount model is unrealistic. They argue that no one can forecast dividends into the distant future with very much accuracy. Techneoly, the model calls for an estimate of all dividends from now to infinity, which is an impossible task, which is the reason why this researcher would like to propose an alternative approach.

Lastly, Jones (1991) noted that since investors want capital gains more than dividends, it is not desirable to focus only on dividends. The author hopes that this analysis will not only be easier to use, but also help investors to analyze other approaches such as the dividend-discount model (DDM) with greater understanding.

Literature Review

One of the most interesting aspects to date is the differing views people hold concerning price-earnings ratio. Some authors, such as Reingrann (1981), and Cook and Ryffel (1984), examine the relation between P/E ratio, risk, and returns. Their work suggests that the level of P/E ratios is related to firm size and unsystematic risk. While others like Keown, Princethorpe and Chen (1987), indicate that portfolio selection can be based upon P/E ratio. But Constantine, Freitas, and Sullivan (1991) find that several other factors affect price-earning ratios and market values of Japanese firms; thus forming a perhaps neglected view that P/E is a function of several new variables besides the traditional one identified by Jones (1991). Fairfield (1994) argues that more factors need to be analyzed. Some attacks on dividend discount model (DDM), and an Jones (1991), if limited use, because of the restrictive assumption it makes about dividend policy. She contends that the DDM can be stated directly in terms of accounting information between accounting data and future dividends, with no restrictions on payout policy. The model focuses on the estimation of future profitability and the firm’s expected growth rate of dividends. This research supports the model and indicates that different P/E-P/B combinations are associated with different types of future profitability.
Dividend signaling models examine, by Bharati-Murty (1979), John and Williams (1985), and Miller and Rock (1985) suggest that dividend changes are used by firms to convey future earnings information. This supports the argument that dividends are positively related to earning growth and they are good determinants of the PE ratio. But Watts (1973), and Cook (1978), found out based on time series regression analysis dividends convey very little information about subsequent earnings of the firm. As such, they see very little relationship between earnings growth and dividends. Miller and Rock (1985) however, do confirm that it is the unexpected dividends that convey information about the firm’s likely earnings. In their framework, the dividend announcement serves to provide information that the market needs to establish the firm’s true earnings.

In his pioneering work, Linter (1956), put forward a similar point of view, he found that vamaprs tend to change dividends proportionately in response to an unanticipated and non-transitory change in their firm’s earnings. Linter’s findings suggest that dividend decisions are driven by changes in some measure of long-run sustainable or permanent, rather than current earnings. Based on this theory, Marsh and Morton (1987) point out that permanent earnings measure the intrinsic value of the firm, where the intrinsic value equals the present value of expected future cash flows available to current shareholders. The basic assumption in this model is that the firm’s stock price is equal to its intrinsic value per share, as estimated by the firm’s management. Marsh and Morton (1987) add that the dividend changes made by managers are analogous of the consumption changes in the lifetime consumption decision problems of individuals.

Thus, the relationship between changes in permanent earnings and dividends is consistent with the direction of causation between changes in wealth and consumption that typically is assumed for the lifecycle model. Based on the above findings, we note that certain important operating variables need to be stressed and that, there is a strong relation between growth earnings, dividend payout, other variables, and PE ratio.

John and Williams (1985), find that the potential determinant of the effectiveness of dividend signaling for each firm are: (a) systematic risk, (b) idiosyncratic risk; (c) debt-equity ratio; (d) magnitude of new equity financing; (e) average percentage change in new investment, (f) earnings volatility; (g) earnings persistence; (h) firm size. This indicates that some factors need to be analyzed, and that there is a strong relationship between dividends, firm size, return on equity, growth in earnings, leverage, sales, and fixed assets of a firm to and its PE ratio. John and Williams (1985), suggest that the higher the risk, the lower the true present value of future cashflows, and the lower the effectiveness of signaling.

Kumar’s findings (1988), do not differ from the above, stating that the reliability of the dividend signaling effect is inversely related to firm risk. A firm with a higher systematic risk has less freedom to signal the market about future dividends. Much can be learned about such firm’s future prospects from the aggregate market’s prospects, as proxies for market price changes, independent of any signaling. Regarding the relationship with leverage, Miller and Rock (1985) suggest that new financing may not signify lower than expected earnings, and therefore offset the dividend announcement effect, thus, new
equity issues represent an increase in external financing. Showing that equity financing reduces the signaling effects of a given change in dividends. The variable of new equity financing is defined as the percentage dollar change in common equity, and it is the debt/equity ratio which measures leverage. From the above literature review, it can be seen that, most dividend signaling models assume away, or pay very little attention to the problems related to the capital structure of a firm. But Kaley’s findings (1982), show a negative cross-sectional relationship between the dividends that can be paid out by the firm and the debt/equity ratio. Kaley’s findings imply that the effectiveness of dividend signaling may have negative relationship with the firm’s debt/equity ratio, because potential conflicts between stockholders and bondholders may further weaken managerial ability to utilize dividends to transmit inside information. The higher the earnings volatility, the greater the uncertainty in future earnings prospects. In conclusion we predict a lower responsiveness of stock prices to unexpected changes in dividends.

The Relationship Between Size, Growth and Dividends

Relating size, growth and dividends, the theoretical view is that more productive firms usually have more investment projects and enjoy higher growth and earnings. According to Denis (1994), high growth firms are those firms with high and increasing levels of market/book value, Tobin’s Q, and R&D/Sales, or those firms that pay no dividends in a short run. In other words, high growth firms are those firms that appear to be smaller, younger, and high risk. Therefore, the possibility that the so called signaling effect may be positively related to net investment increases. Also, it suggests that the effectiveness of dividend signaling may also depend on firm size. Since analysts tend to concentrate on larger firms, dividend announcements may not convey much additional information. But, dividend announcements of smaller firms may be more informative, and if so, then the effectiveness of dividend signaling is likely to be negatively related to firm size. The above arguments support the author’s view that the effectiveness of dividend signaling depends on specific firm characteristics. As per existing dividend signaling theory, the strength of dividend signaling is negatively related to the firms systematic risk, external equity financing and size and also positively related to net investment and earnings growth. It then follows that if dividends are positively related to P/E ratio, then P/E ratio is negatively related to systematic risk, external equity financing, size, and positively related to net investment and earnings growth.

The effect of earning-price (E/P) has been investigated by other researchers such as Banz (1981) and Banzu (1977 and 1983). Banz found abnormal returns for the smallest size portfolio, while the largest size portfolio recorded lower abnormal returns. Banz used a randomization technique to distinguish between several concurrent effects. This involved ranking firms on the basis of one variable, such as size, and assigning firms to different groups. It can therefore be concluded that significant interactions between size and E/P are evident. Bhabra and Kim (1994) confirm the findings of Banz (1983) and Cook and Roseff (1984), in that there is substantial interactions between size and E/P effects. So, small firms with high E/P ratios can earn so much more per month compared to big firms, on a risk adjusted basis.

Further observation has been made by Nameth (1993) (see Table 1), He clearly
shown the relationship between assets and P/E ratio, and market capitalization. He observes "coming out of recession, smaller companies tend to rebound faster and to a greater degree than larger companies". Delgado, director of research at Heartland, agrees, and adds that while large companies have an advantage of consistency over smaller companies, it is these smaller companies that, given the initial stages of expansion in the economy, can get "a bang for the buck".

In the same article, Don Phillips, reports small capitalization value managers have decreased their cash position from 11 percent to 9 percent, while large capitalization growth managers have increased their position from 9 percent to 11 percent. This can show that highly growing firms are smaller companies with relatively high P/E ratios compared to large and no growth firms.

According to Lakoshick, Shriver and Visintiny (1993), there are variables that allow investors to identify stocks that are mispriced, thus creating returns in excess of what is required to compensate investors for risk. He looks at variables such as book to market equity, cash flow yield, and earnings yield, which are calculated using information that appears in financial statements. Davis (1994) confirms this, and also identifies the variables of primary focus in book to market equity, earnings yield (P/E ratio), cash flow yield (cash flow price), and historical sales growth.

According to Filiates (1992), when companies do not give out dividends, the market is assumed to be in the favor that such variables like P/E, research and development, growth rate in operating income and others generally increase more than those companies which have either suspended dividends or have high and sustainable dividends (see Table 2).

The Relationship Between Price-Earnings Ratio and Leverage

The relationship between price-earnings ratio (P/E) and leverage have been

<table>
<thead>
<tr>
<th>Fund</th>
<th>Total S yr. return</th>
<th>Assets 1992</th>
<th>P/E Ratio</th>
<th>Yield on 9/30/92</th>
<th>Median Market cap (mll)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity strategy</td>
<td>17.7%</td>
<td>$80,340</td>
<td>13.6</td>
<td>0.0%</td>
<td>$405</td>
</tr>
<tr>
<td>F&amp;M Value</td>
<td>11.9</td>
<td>21.8</td>
<td>15.3</td>
<td>0.4</td>
<td>113</td>
</tr>
<tr>
<td>Fidelity/low price stock</td>
<td>37.3</td>
<td>850.3</td>
<td>15.5</td>
<td>0.7</td>
<td>86</td>
</tr>
<tr>
<td>Gradison</td>
<td>16.0</td>
<td>51.1</td>
<td>13.2</td>
<td>0.7</td>
<td>406</td>
</tr>
<tr>
<td>Greenspring</td>
<td>19.9</td>
<td>18.9</td>
<td>10.2</td>
<td>5.5</td>
<td>353</td>
</tr>
<tr>
<td>Heartland</td>
<td>18.8</td>
<td>37.3</td>
<td>14.6</td>
<td>2.9</td>
<td>43</td>
</tr>
</tbody>
</table>

*Currently closed to investors. See how small companies perform! Source: Morningstar Incorporation (1992)

ISSN/002-7967
<table>
<thead>
<tr>
<th>Descriptive Measures</th>
<th>Type of Firm</th>
<th>No-Dividends</th>
<th>Dividend Initiating</th>
<th>Surging Dividends</th>
<th>High-Stable Dividends</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mean market value of equity (millions)</td>
<td>325.45</td>
<td>141.31</td>
<td>514.54</td>
<td>185.63</td>
<td></td>
</tr>
<tr>
<td>2. Mean leverage ratio</td>
<td>.28</td>
<td>.41</td>
<td>.49</td>
<td>.38</td>
<td></td>
</tr>
<tr>
<td>3. Growth rate of market value of equity</td>
<td>.26</td>
<td>.15</td>
<td>.07</td>
<td>.04</td>
<td></td>
</tr>
<tr>
<td>4. Growth rate of sales</td>
<td>.35</td>
<td>.22</td>
<td>.011</td>
<td>.01</td>
<td></td>
</tr>
<tr>
<td>5. Growth rate of operating income</td>
<td>.31</td>
<td>.20</td>
<td>.15</td>
<td>.08</td>
<td></td>
</tr>
<tr>
<td>6. Growth rate of total assets</td>
<td>.29</td>
<td>.20</td>
<td>.12</td>
<td>.09</td>
<td></td>
</tr>
<tr>
<td>7. Capital expenditure/total assets</td>
<td>.36</td>
<td>.12</td>
<td>.08</td>
<td>.07</td>
<td></td>
</tr>
<tr>
<td>8. Research and development</td>
<td>.07</td>
<td>.01</td>
<td>.01</td>
<td>.01</td>
<td></td>
</tr>
<tr>
<td>10. Tobin’s Q</td>
<td>3.31</td>
<td>1.63</td>
<td>1.48</td>
<td>1.01</td>
<td></td>
</tr>
<tr>
<td>11. N</td>
<td>57</td>
<td>19</td>
<td>23</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

All data are taken from the annual Compustat tapes.

Source: Pilottti (1992)

analyzed by many researchers. Dann and Mikkelsen (1984), Arquith and Mullins (1985), Eckbo (1986), Masulis and Korwar (1986), Baeley and Litzenberger (1988) and Hansen and Badashley (1990), all documented the average stock price response when firms announce a new securities issue. The evidence indicates a significant reduction in stock price upon the announcement of new equity or convertible debt issue. Offering straight debt or preferred stock results in nonpositive but significant stock price reactions. Most importantly, these studies did examine the determinants of stock price response on, for example, growth opportunities. The asymmetric information model of Amburah, John, and Williams (1987), and the free cash flow theory of Jensen (1986) provide evidence that stock price response to new financing depends on the growth prospects of the issuing firm.
These studies also examined the effect of firm size. For mature firms, or firms having limited growth opportunities, a negative price response is predicted while a positive price response is predicted for growth firms, i.e., firms having many valuable growth opportunities. Additionally, the stock price response to debt offering appears to be a function of growth opportunities, rather than the type of debt (security straight or convertible) offered. Further evidence of the effect of growth opportunities is a cross regression analysis, which indicates that the stock price response to new financing is positively related to a variety of growth opportunity measures.

Myers and Majluf (1984), present a model in which managers are aware of the value of a firm's assets in place and its growth opportunities. Rational investors are aware only of the probability distribution of these variables. In this framework, the author shows that managers acting in their shareholders' interest only sell securities when firm's stock price is overvalued. Recognizing managers' incentives, investors interpret the decision to issue securities as bad news about the firm's intrinsic value: so stock price falls when a firm issues new securities.

Myers and Majluf (1984), also noted that when the value of the assets in place is known with certainty to outsiders, an exception can occur. In this case the decision to issue securities signals new investment not bad news. The stock price reaction to offering is non negative, since negative net present value (NPV) projects are rejected. The second exception they found is that when growth opportunities are so valuable that a firm cannot affect to pass them up. In this case the decision to issue convey no information, so there should be no reaction. So the most important aspect for us to note here is that generally, stock price response to security offering does not vary with growth opportunities, only at extremends.

On a similar note, Miller and Rock (1985) present a model in which managers are aware of the deviation of current period earnings from the expected value but investors do not have this information. Since the firms sources and uses of funds must be equal, investors are able to deduce the amount of the deviation of earnings from the expected value by observing the firm's financing and dividend decisions. The market interprets unexpected changes in the net dividend as a signal of like changes in earnings. The announcement of net dividends reflects earnings perfectly because it is assumed that the market has complete knowledge of the firm's production opportunities and is thus able to perfectly forecast investment. We can conclude from the above also, that for mature firms, it is likely that the market would assign the higher probability to investment scenario. That is why Miller and Rock suggest that the stock price reaction to new financing depends on the market's imperfect assessment of the offering firm's growth opportunities.

Anbarjian, John and Williams (1987) generalize Miller and Majluf (1984) by constructing a model such that financing and dividends convey information about value of assets in place, and for the value of growth opportunities. They show that the stock price response to new financing depends on the relative contribution of assets in place, and on the growth opportunities to information asymmetry. They add that for mature firms, this is firms for which the "predominant source of information is assets in place" the announcement effect is negative. For a growth firm, for which the predominant source of information is
growth opportunities," the announcement effect in positive. In another development, Jensen (1986) hypothesizes that free cash flow, that is cash flow in excess of that required to fund all positive NPV projects, is likely to be wasted on organizational inefficiencies or invested in negative NPV projects because managers have incentives to cause their firms to grow beyond optimal size (even if they do not make profits). This theory of free cash flow suggests a role for growth opportunities in the determination of the stock price response to new financing. He concludes just as the above: "For mature firms with limited profitable growth opportunities, there will be an automatic decline in the stock prices because raising of funds is perceived as creating free cash flow. For rapidly growing firms with profitable opportunities, the change is likely to be positive because the new fund enables the firm to acquire positive NPV projects." He also remarks that: "It is assumed that firms which have never paid dividends are likely to be growth firms while firms with high stable dividends and firms that have suspended dividends are likely to be mature firms".

The conclusions of Leibowitz and Kogelman (1991), are not far form earlier researchers because this is what they say in all: "The key to understanding a firm's PME ratio can be found in its franchise

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Asset</td>
<td>Taken as the transformation of log of annual depreciation and accumulated depreciation of the firm</td>
</tr>
<tr>
<td>Dividend payout</td>
<td>The transformation of log of the annual dividend payout ratio at the end of the reporting year</td>
</tr>
<tr>
<td>Sales</td>
<td>The transformation of log of sales of the firm at the end of the reporting year</td>
</tr>
<tr>
<td>Earning growth</td>
<td>Taken as the transformation of the log of the annual earning growth of the firm</td>
</tr>
<tr>
<td>Size</td>
<td>Taken as the transformation of the log of the annual total assets of the firm</td>
</tr>
<tr>
<td>ROE</td>
<td>The transformation of the log of the annual return on equity of the firm</td>
</tr>
<tr>
<td>Leverage</td>
<td>The transformation of the ratio of a firm's total long-term debt to its outstanding equity at the end of the reporting year</td>
</tr>
<tr>
<td>Price/Earning ratio</td>
<td>The ratio of stock price to earnings</td>
</tr>
</tbody>
</table>

NB. Log transformation was used because it provides additional confidence in statistical results in that it: (a) yields a distribution-free data; (b) provides similar results to those that can be derived from ordinal transformation; and (c) mitigates the impact of measurement errors, outliers and residual heteroscedasticity on the regression results.
value—that is its opportunity to earn above market returns on its investment. Firms with a high franchise value have high P/Es, and a large component of their stock price is based on future earnings. For such firms, the addition of leverage should result in even higher P/Es. Firms with relatively low P/Es should experience the opposite effect. Their P/Es should decline with the addition of leverage.

Variable Description and Conceptual Framework

A full description of the variables that were used in this research is shown in Table 1. These variables were analyzed using annual data.

Sample Selection Procedure

The sample firms selected were taken from manufacturing firms, and financial firms were not considered. One reason for this is that such firms do not provide sufficient information concerning variables such as sales. Thus, the six industries considered were: (a) the electronic industry; (b) the computer services industry; (c) the food, beverage and restaurant industry; (d) the pharmaceutical industry; (e) the clothing industry; and (f) the furniture/cut material industry. It is important to note that each industry was analyzed for a period of six years.

The Conceptual Framework for Ratio Analysis

To develop a framework for ratio analysis, we start with the constant growth dividend discount model which states that the current stock price \( p_s \) is equal to the expected dividend in the first year \( D_0 \), divided by the difference between the appropriate risk-adjusted discount rate \( r \) and the expected long-term growth rate \( g \):

\[
p_s = \frac{D_0}{r - g}
\]

In order simplify the above model we assume that dividends grow at a constant rate of \( g \) ad infinitum—an unrealistic assumption for individual common stocks. Therefore, one should bear in mind that this framework for ratio analysis does not describe the exact functional relationship between the various ratios and stock prices; the dynamic nature of the security markets and the evaluation process means we probably never know the exact nature of these relationships. However, we can develop a framework for describing the general relationship between prices and financial ratios.

To do this we define the following additional variables:

- \( E = \) Earnings per share
- \( EAT = \) earnings per share outstanding
- \( BV = \) book value per share
- \( ROE = \) common shareholders' equity divided by the number of shares outstanding

The equation can be modified further as indicated below:

\[
P = \frac{E - b}{r - g}
\]

Where \( D = E_b \)

We can further expand this equation by noting that \( E = ROE \cdot BV \) and substituting for \( E \) in the above equation.

\[
P = \frac{ROE \cdot BV}{r - g}
\]

Thus, stock prices are a positive function of \( ROE \), \( BV \), \( b \), and \( g \), and a negative function of \( r \). That is with everything else held constant, the higher the return on
equity, the higher the stock price: similar ceteris paribus arguments hold for book value, payout ratio, and growth rate. Conversely ceteris paribus the higher the required discount rate, the lower the stock price. The above analysis can also be applied to the relationship between growth and return on equity. To do this, we need to make three simplifying assumptions: (1) ROE is constant over time and is defined as earning after taxes divided by initial stockholders’ equity. On a per share basis, ROE = E / BV, (2) the payout ratio b is constant over time, and (3) the firm finances new assets through retained earnings and therefore, does not issue any new debt or shares of common stock. Given these assumptions, it can be shown that the dividend growth rate, and also the earnings growth rate will be:

\[ g = ROE \times (1 - b) \]

That is, the long-run growth rate of dividends and earnings is equal to the firm’s return on equity multiplied by 1 minus the payout ratio. This estimate of the firm’s long-run growth rate is referred to by some analysts as the sustainable growth rate or the grow-back twin.

This model for estimating g has several pleasing features. First, it is simple to calculate and therefore represents an easy starting point in the process of estimating growth rates. In addition, by assuming no additional outside financing, and by holding the return on equity constant, this model does not allow for increases in ROE (and consequently the growth rate) through increased leverage. In the long run this is reasonable, since there are practical limits as to how much debt a firm can issue.

On the other hand, this model is based on obviously unrealistic assumptions. Returns on equity is not constant but varies from year to year, and firms do engage in outside financing. Thus, when using historical data to estimate the growth rate, one should probably use an average of the firm’s ROE over a period of years, rather than simply the most recent year’s ROE. Similar observations can be made concerning the assumption of constant payout ratio.

ROE, P/E, and N/E Ratios also can be easily related. By rearranging the terms in the previous equations and substituting \( g = ROE \times (1 - b) \) we have:

\[ \frac{P}{E} = \frac{ROE \times (1 - b)}{b} \]

Thus, the P/E ratio is a positive function of ROE and a negative function of b, the discount rate. It is not clear what effect the payout ratio b has on the P/E, since an increase in b will simultaneously increase the numerator and the denominator.

A similar analysis can be applied to P/E ratios. By substituting \( g = ROE \times (1 - b) \) into the above equations and rearranging terms we have:

\[ P/E = \frac{1}{b \times (r - ROE \times (1 - b))} \]

Again, note that the P/E ratio is a positive function of ROE and a negative function of the discount rate, and the relationship with the payout ratio is perhaps ambiguous.

Variable Descriptive Statistics and The Results of The Study

The following equation provides the basis of the (OLS) multivariate regression estimates:

\[ PV = b_0 + b_1 \times E + b_2 \times ROE + b_3 \times Sales + b_4 \times Div + b_5 \times Size + b_6 \times ROE \times Leverage \]

Where:

- PV = Fixed Assets of the Firm

\[ \text{AROLE \#858871} \]
EG = Earning Growth of the Firm
Sale = Sales
Div = Dividends
Size = Size of the Firm
ROE = Return on Equity
Lever = Leverage
e = Error Term

This study showed significant associations between the price-earnings ratio and the seven variables in most cases. The F test, T-values and their P-values are shown below as analysis of the electronic industry. The full results of the analysis of this industry can be seen in the Table 4. In this industry as well as others, these ratios provide strong explanatory power.

The F test, T-values and their P-values for the services industry are shown in Table 5; all variables were significant. The results of analysis of the food and beverage industry also showed significant associations between price-earnings ratio and six out of the seven variables. The F test, T-values and their P-values are indicated in Table 6. Study of the pharmaceutical industry showed significant associations between the price-earnings ratio and six of the

<table>
<thead>
<tr>
<th>Variable</th>
<th>Predicted Sign</th>
<th>β</th>
<th>T-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td></td>
<td>2.13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed Asset</td>
<td></td>
<td>-0.045</td>
<td>-1.68</td>
<td>0.099</td>
</tr>
<tr>
<td>Dividend</td>
<td>+</td>
<td>0.13</td>
<td>35.4</td>
<td>0.0000</td>
</tr>
<tr>
<td>Sales</td>
<td>+</td>
<td>-0.03</td>
<td>-13.9</td>
<td>0.0000</td>
</tr>
<tr>
<td>Size</td>
<td>+</td>
<td>-0.05</td>
<td>-12.1</td>
<td>0.0000</td>
</tr>
<tr>
<td>Leverage</td>
<td>+</td>
<td>-0.047</td>
<td>-66.1</td>
<td>0.0000</td>
</tr>
<tr>
<td>Return on equity</td>
<td>+</td>
<td>0.18</td>
<td>9.0</td>
<td>0.0000</td>
</tr>
<tr>
<td>Earning growth</td>
<td>+</td>
<td>-0.026</td>
<td>-2.8</td>
<td>0.0698</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td></td>
<td></td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Standard error</td>
<td></td>
<td></td>
<td>0.23</td>
<td></td>
</tr>
<tr>
<td>β Ratio</td>
<td></td>
<td>205.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Durbin-Watson test</td>
<td></td>
<td>2.25</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The T-value significance test = 0.05 level. The variables remain with their original definitions as residuals. FA is the sum of annual depreciation and accumulated depreciation of the firm; Div is the log annual dividend payout ratio of the firm. Sales is the log annual sales of the firm. Size is the log annual total assets of the firm; Leverage is the debt-equity ratio of the firm; ROE is the log annual return on equity; GG is the log earnings growth of the firm. The electronic industry showed all the variables significant at 0.01 as predicted above. The negative sign of earnings growth can perhaps be attributed to sample selection procedures.
seven variables. The F-test, T-values and their p-values are indicated Table 7.
The F-test, T-values and their p-values are shown in Table 8 following analysis of the clothing and retail industry. Significant results for six variables were found for this industry.

The study also revealed significant associations between the price-earnings ratio and six variables in building raw material industry. The F-test, T-values and their p-values are indicated in Table 9.

In order to test whether there is a significant difference among the six industries or whether these factors differ significantly from industry to industry, we conducted an ANOVA test. The result of the analysis of variance are indicated in Table 10 with an F(5,41) = 0.333 with a p-value (p = 0.7512). The results indicate that there is no significant difference in the explanatory power of these variables in the six industries. In other words, variables such as fixed assets, dividends, sales, size, leverage, return on equity and earning growth have the same explanatory power in the selected industries of electronic, service, foods and beverage, pharmaceuticals, clothing and the building raw material industry. In addition, these results seem to demonstrate that at 0.05 level the variables analyzed have got the explanatory power regardless of the nature of the industry in question.

Table 5. The Regression Model in the Services Industry

<table>
<thead>
<tr>
<th>Variable</th>
<th>Predicted Sign</th>
<th>β</th>
<th>T-Value</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-</td>
<td>1.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed Assets</td>
<td>+</td>
<td>+0.0419</td>
<td>11.65</td>
<td>0.0000</td>
</tr>
<tr>
<td>Dividends</td>
<td>+</td>
<td>+0.2</td>
<td>13.86</td>
<td>0.0000</td>
</tr>
<tr>
<td>Sales</td>
<td>+</td>
<td>-0.12</td>
<td>-32.07</td>
<td>0.0000</td>
</tr>
<tr>
<td>Size</td>
<td>+</td>
<td>+0.056</td>
<td>19.05</td>
<td>0.0000</td>
</tr>
<tr>
<td>Leverage</td>
<td>-</td>
<td>-0.0778</td>
<td>-21.69</td>
<td>0.0000</td>
</tr>
<tr>
<td>Return on equity</td>
<td>+</td>
<td>+0.17</td>
<td>27.60</td>
<td>0.0000</td>
</tr>
<tr>
<td>Earning growth</td>
<td>+</td>
<td>+0.00352</td>
<td>2.07</td>
<td>0.4971</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>-</td>
<td>0.98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard error</td>
<td>-</td>
<td>0.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>-</td>
<td>0.77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Durbin-Watson test</td>
<td>-</td>
<td>2.99</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The t-value significant test = 0.05 level. The variables remain with their original definitions as indicated. PA is the sum of log of annual depreciation and accumulated depreciation of the firm. Div is the log annual dividend payout ratio of the firm. Sales is the log annual sales of the firm. Size is the log annual total assets of the firm. Leverage is the Debt/Equity rate of the firm. ROE is the log firms return on equity. EG is the log earning growth of the firm. As predicted, the variables were significant at 0.05 level.
### Table 6. The Regression Model in the Food and Beverage Industry

<table>
<thead>
<tr>
<th>Variable</th>
<th>Predicted Sign</th>
<th>$b$</th>
<th>T-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td></td>
<td>0.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed Assets</td>
<td>-</td>
<td>-0.00235</td>
<td>-0.17</td>
<td>0.80980</td>
</tr>
<tr>
<td>Dividends</td>
<td>+</td>
<td>+0.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sales</td>
<td>+</td>
<td>+0.29</td>
<td>34.3</td>
<td>0.0000</td>
</tr>
<tr>
<td>Size</td>
<td>+</td>
<td>+0.27</td>
<td>-18.3</td>
<td>0.0000</td>
</tr>
<tr>
<td>Leverage$^2$</td>
<td>+</td>
<td>+0.2</td>
<td>30.5</td>
<td>0.0000</td>
</tr>
<tr>
<td>Return on equity</td>
<td>+</td>
<td>+0.59</td>
<td>-18.0</td>
<td>0.0000</td>
</tr>
<tr>
<td>Earning growth</td>
<td>+</td>
<td>+0.077</td>
<td>18.4</td>
<td>0.0000</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td></td>
<td></td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Standard error</td>
<td></td>
<td>0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F: Ratio</td>
<td></td>
<td>1565.65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Durbin-Waston test</td>
<td></td>
<td>2.07</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The $T$-value significant test = 0.05 level. The variables remain with their original definitions as indicated. FA is the sum log of the annual depreciation and accumulated depreciation of the firm; Div is the log annual dividend payout ratio of the firm; Sales is the log annual sales of the firm; Size is the log annual total assets of the firm; Leverage is the debt/equity ratio of the firm; ROE is the log of firm return on equity; EGG is the log earnings growth of the firm. As predicted, the variables were significant at 0.05 level, save fixed assets.

### Table 7. The Regression Model in the Pharmaceutical Industry

<table>
<thead>
<tr>
<th>Variable</th>
<th>Predicted Sign</th>
<th>$b$</th>
<th>T-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td></td>
<td>1.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed Assets</td>
<td>-</td>
<td>-0.34</td>
<td>-34.0</td>
<td>0.0000</td>
</tr>
<tr>
<td>Dividends</td>
<td>+</td>
<td>+0.15</td>
<td>-16.3</td>
<td>0.0000</td>
</tr>
<tr>
<td>Sales</td>
<td>+</td>
<td>+0.11</td>
<td>-19.1</td>
<td>0.0000</td>
</tr>
<tr>
<td>Size</td>
<td>+</td>
<td>+0.17</td>
<td>-13.4</td>
<td>0.0000</td>
</tr>
<tr>
<td>Leverage</td>
<td>+</td>
<td>+0.12</td>
<td>-18.8</td>
<td>0.0000</td>
</tr>
<tr>
<td>Return on equity</td>
<td>+</td>
<td>+0.052</td>
<td>7.41</td>
<td>0.0000</td>
</tr>
<tr>
<td>Earning growth</td>
<td>+</td>
<td>+0.054</td>
<td>-0.63</td>
<td>0.2432</td>
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<tr>
<td>Adjusted $R^2$</td>
<td></td>
<td></td>
<td>0.99</td>
<td></td>
</tr>
<tr>
<td>Standard error</td>
<td></td>
<td>0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F: Ratio</td>
<td></td>
<td>747.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Durbin-Waston test</td>
<td></td>
<td>1.622</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The $T$-value significant test = 0.05 level. The variables remain with their original definitions as indicated. FA is the sum log of the annual depreciation and accumulated depreciation of the firm; Div is the log annual dividend payout ratio of the firm; Sales is the log annual sales of the firm; Size is the log annual total assets of the firm; Leverage is the debt/equity ratio of the firm; ROE is the log of firm return on equity; EGG is the log earnings growth of the firm. As predicted, the variables were significant at 0.05 level, save earnings growth.

---

**Table 6.** The Regression Model in the Food and Beverage Industry

<table>
<thead>
<tr>
<th>Variable</th>
<th>Predicted Sign</th>
<th>$b$</th>
<th>T-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td></td>
<td>0.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed Assets</td>
<td>-</td>
<td>-0.00235</td>
<td>-0.17</td>
<td>0.80980</td>
</tr>
<tr>
<td>Dividends</td>
<td>+</td>
<td>+0.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sales</td>
<td>+</td>
<td>+0.29</td>
<td>34.3</td>
<td>0.0000</td>
</tr>
<tr>
<td>Size</td>
<td>+</td>
<td>+0.27</td>
<td>-18.3</td>
<td>0.0000</td>
</tr>
<tr>
<td>Leverage$^2$</td>
<td>+</td>
<td>+0.2</td>
<td>30.5</td>
<td>0.0000</td>
</tr>
<tr>
<td>Return on equity</td>
<td>+</td>
<td>+0.59</td>
<td>-18.0</td>
<td>0.0000</td>
</tr>
<tr>
<td>Earning growth</td>
<td>+</td>
<td>+0.077</td>
<td>18.4</td>
<td>0.0000</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td></td>
<td></td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Standard error</td>
<td></td>
<td>0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F: Ratio</td>
<td></td>
<td>1565.65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Durbin-Waston test</td>
<td></td>
<td>2.07</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The $T$-value significant test = 0.05 level. The variables remain with their original definitions as indicated. FA is the sum log of the annual depreciation and accumulated depreciation of the firm; Div is the log annual dividend payout ratio of the firm; Sales is the log annual sales of the firm; Size is the log annual total assets of the firm; Leverage is the debt/equity ratio of the firm; ROE is the log of firm return on equity; EGG is the log earnings growth of the firm. As predicted, the variables were significant at 0.05 level, save fixed assets.

**Table 7.** The Regression Model in the Pharmaceutical Industry

<table>
<thead>
<tr>
<th>Variable</th>
<th>Predicted Sign</th>
<th>$b$</th>
<th>T-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td></td>
<td>1.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed Assets</td>
<td>-</td>
<td>-0.34</td>
<td>-34.0</td>
<td>0.0000</td>
</tr>
<tr>
<td>Dividends</td>
<td>+</td>
<td>+0.15</td>
<td>-16.3</td>
<td>0.0000</td>
</tr>
<tr>
<td>Sales</td>
<td>+</td>
<td>+0.11</td>
<td>-19.1</td>
<td>0.0000</td>
</tr>
<tr>
<td>Size</td>
<td>+</td>
<td>+0.17</td>
<td>-13.4</td>
<td>0.0000</td>
</tr>
<tr>
<td>Leverage</td>
<td>+</td>
<td>+0.12</td>
<td>-18.8</td>
<td>0.0000</td>
</tr>
<tr>
<td>Return on equity</td>
<td>+</td>
<td>+0.052</td>
<td>7.41</td>
<td>0.0000</td>
</tr>
<tr>
<td>Earning growth</td>
<td>+</td>
<td>+0.054</td>
<td>-0.63</td>
<td>0.2432</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td></td>
<td></td>
<td>0.99</td>
<td></td>
</tr>
<tr>
<td>Standard error</td>
<td></td>
<td>0.01</td>
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<td></td>
</tr>
<tr>
<td>F: Ratio</td>
<td></td>
<td>747.5</td>
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<td></td>
</tr>
<tr>
<td>Durbin-Waston test</td>
<td></td>
<td>1.622</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The $T$-value significant test = 0.05 level. The variables remain with their original definitions as indicated. FA is the sum log of the annual depreciation and accumulated depreciation of the firm; Div is the log annual dividend payout ratio of the firm; Sales is the log annual sales of the firm; Size is the log annual total assets of the firm; Leverage is the debt/equity ratio of the firm; ROE is the log of firm return on equity; EGG is the log earnings growth of the firm. As predicted, the variables were significant at 0.05 level, save earnings growth.
Table 8. The Regression Model in the Clothing and Retail Industry

<table>
<thead>
<tr>
<th>Variable</th>
<th>Predicted</th>
<th>β</th>
<th>T-value</th>
<th>P-value</th>
</tr>
</thead>
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<tr>
<td>Dividends</td>
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<td>0.0144</td>
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</tr>
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<tr>
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<td>4.681</td>
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<tr>
<td>Leverage</td>
<td>+</td>
<td>-0.17</td>
<td>-9.10</td>
<td>0.0000</td>
</tr>
<tr>
<td>Return on equity</td>
<td>+</td>
<td>-0.26</td>
<td>-14.13</td>
<td>0.0000</td>
</tr>
<tr>
<td>Earnings growth</td>
<td>+</td>
<td>-0.19</td>
<td>-8.31</td>
<td>0.0000</td>
</tr>
<tr>
<td>Adjusted R²</td>
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<td></td>
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</tr>
<tr>
<td>Standard error</td>
<td></td>
<td></td>
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<tr>
<td>F Ratio</td>
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<tr>
<td>Durbin-Watson test</td>
<td></td>
<td></td>
<td>1.7920</td>
<td></td>
</tr>
</tbody>
</table>

Note: The T-value significant test = 0.05 level. The variables remain with their original definitions as indicated before. F A is the sum log of annual depreciation and accumulated depreciation of the firm; Div is the log annual dividend payout ratio of the firm, Sales is the log annual sales of the firm, Size is the log annual total assets of the firm, Leverage is the debt/equity ratio of the firm; ROE is the log firms return on equity, EG is the log earning growth of the firm. As predicted, the variables were significant at 0.05 level, save dividends.

Table 9. The Regression Model in the Building-(raw material) Industry

<table>
<thead>
<tr>
<th>Variable</th>
<th>Predicted</th>
<th>β</th>
<th>T-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
<td></td>
</tr>
<tr>
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<td>-</td>
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<tr>
<td>Dividends</td>
<td>+</td>
<td>+0.4</td>
<td>10.9</td>
<td>0.0000</td>
</tr>
<tr>
<td>Sales</td>
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<td>+</td>
<td>-0.25</td>
<td>-14.0</td>
<td>0.0000</td>
</tr>
<tr>
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<td>-0.091</td>
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<tr>
<td>Earnings growth</td>
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</tr>
<tr>
<td>Adjusted R²</td>
<td></td>
<td></td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>Standard error</td>
<td></td>
<td></td>
<td>0.02</td>
<td></td>
</tr>
<tr>
<td>F Ratio</td>
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<td>197.1</td>
<td></td>
</tr>
<tr>
<td>Durbin-Watson test</td>
<td></td>
<td></td>
<td>1.88</td>
<td></td>
</tr>
</tbody>
</table>

Note: The T-value significant test = 0.05 level. The variables remain with their original definitions as indicated before. FA is the sum log of annual depreciation and accumulated depreciation of the firm; Div is the log annual dividend payout ratio of the firm, Sales is the log annual sales of the firm, Size is the log annual total assets of the firm, Leverage is the debt/equity ratio of the firm; ROE is the log firms return on equity, EG is the log earning growth of the firm. As predicted, the variables whose significant at 0.05 level, save sales.
Table 10: One-way ANOVA for Six Industries

<table>
<thead>
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<th>Industry</th>
<th>Mean</th>
<th>Number</th>
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</thead>
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<td>Electronic</td>
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</tr>
<tr>
<td>Service</td>
<td>2.919</td>
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</tr>
<tr>
<td>Foods</td>
<td>7.271</td>
<td>7</td>
</tr>
<tr>
<td>Pharmaceutical</td>
<td>-3.852</td>
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<td>Clothing</td>
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<tr>
<td>Building</td>
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<tr>
<td>P-Value</td>
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</table>

Conclusion

The study examined seven factors which are significantly linked with price-earning ratios in different selected industries. Therefore, this article has sought to add to quantitative literature on the factors determining price-earnings ratios. This study also reveals that while sales, size, fixed assets, dividends, return on equity, leverage, and earnings growth are significant, both negative and positive signs can occur. For example, a negative relationship between P/E ratio and sales may imply that although sales are increasing, profits are not made because of high production costs in a given industry. Negative signs on dividends might indicate that the firms in question are growth firms that eschew paying dividends to fund growth. Leverage can have a positive relationship because firms with high and positive growth opportunities have returns that outperform their leverage payment worries, and thus can make returns to a level greater than the cost of the debt. Secondly, this research supports the view put forward by Lakonishok, Shleifer, and Vishny (1995) who argued that the variables that allow investors to identify stocks that have been mispriced are many, but that few have so far been seen to predict returns. This might also be a basis for creating opportunities for realized returns in excess of the returns required to compensate investors risk. Such a hypothesis has been proved with the results here adding to earlier studies of Connors, Francis, and Sullivan (1991) who investigated the factors influencing price-earnings ratios and market values of Japanese firms. Lastly, while there is no guarantee that these factors will continue so associate significantly with price-earning ratios, they do indicate that the determinants of price-earning ratios include fixed assets, dividend, sales, size, leverage, return on equity, and earnings growth, and that these factors do not vary from industry to industry.
References


