Tobit Regression Analysis on Factors Influencing Dividend Policy of Indonesian Manufacturing Firms

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ABSTRACT

This study seeks to examine the determinants of dividend policies of manufacturing companies in Indonesia. The data for this study were drawn from a balanced sample of 111 public manufacturing firms listed in the Indonesia Stock Exchange between 2009 and 2013. A Tobit regression analysis with cluster-robust standard errors was then employed to find the effects of firm size, profitability, sales growth, financial leverage, and inter-period on the magnitude of dividend yield. This study finds that firm size, profitability, and sales growth positively influence the magnitude of dividends paid relative to stock prices received by shareholders. On the other hand, it also finds that financial leverage negatively affects dividends. Another result suggests the levels of dividends vary across time.

Keywords: Dividend policies, Indonesia Stock Exchange, manufacturing firms, Tobit regression

INTRODUCTION

Researchers have advanced numerous theories that relate the dividends with a firm’s value. Miller and Modigliani (1961) proposed the theory of dividend irrelevance that, in a perfect capital market, a firm’s value depended only on its investment policy and the return that its assets offered. Other researchers pinpoint various factors that cause dividends in practice to be value-relevant. Regardless of the attempts for
decades to analyze dividend behaviours by researchers, however, still, no universally accepted explanation has been set. Black (1976) noted that “The harder we look at the dividend picture, the more it seems like a puzzle, with pieces that don’t fit together.”

The present study investigates the factors that affect dividend policies in Indonesian manufacturing firms. There are three contributions of this study to the existing literature. Firstly, the manufacturing industry is a capital intensive sector that requires huge resources to acquire and replenish its tangible assets. Looking at dividend policies in this kind of environment permits an investigation where firms have relatively illiquid assets because the resources have competed for business needs.

Secondly, this study employs dividend yields to proxies for dividend behaviours. The use of dividend yields allows for looking at dividend behaviours from investors’ viewpoints and, thus, incorporates market factors in analyzing dividend behaviours. The final contribution of this study is the use of a Tobit regression model to investigate the effects of sales growth, profitability, financial leverage, firm size, and inter-period effects on dividend yields. The use of the model is a necessity because the sample is a censored sample that consists of dividend-paying and non-dividend paying firms as explained in McDonald and Moffitt (1980) and Long (1997).

This study found that firm size, profitability, and sales growth positively influenced the magnitude of dividends paid relative to stock prices received by shareholders. On the other hand, it also found that financial leverage negatively affected dividends. Another result suggested the levels of dividends varied across time.

The rest of the article is organized as follows. The next section gives a review of the extant literature on dividend behaviours. Section three discusses the data and methodology. Section four presents and explains the results of the empirical analysis. Finally, section five concludes the study.

**Literature Review**

A dividend is a prorated distribution of assets, especially cash, to shareholders. It has been more than a half-century since Miller and Modigliani (1961) stated that in perfect capital market dividends were irrelevant in determining the value of a company. Researchers seek the relevancy of dividend policies in the real world where capital markets are not perfect. They have devoted considerable efforts to advance dividend theories, not necessarily mutually exclusive, about dividend policies implemented by firms. In addition, De Angelo and DeAngelo (2006) argued that, even in a frictionless market, dividend policy was not irrelevant and a firm’s investments, capital structure, and dividend policies were interrelated.

As mentioned earlier, this study attempted to investigate the determinants of dividend payments in Indonesian manufacturing firms. The choices of some financial and non-financial variables that affected the generosity of dividend payments in this study were based on previous empirical findings in both Indonesia and the
rest of the world. Those variables are firm size, profitability, financial leverage, sales growth, and inter-period as independent variables, while dividend yield as the dependent variable. There are, of course, more factors that have been found to affect corporate dividend policies in the literature. Nevertheless, this study focuses on those items because they can be easily obtained by the public through firms’ and the Indonesia Stock Exchange’s publications.

The firm life cycle theory of dividends contends that firms’ dividend policies follow a natural life-cycle path, from a start-up to a maturity stage, associated with a shrinking growth opportunity set, growth rate reduction, and decreasing cost of raising external capital (Mulyani et al., 2016). Larger firms are generally in a more mature stage and more likely to pay higher dividends because they are able to generate ample amounts of cash and fewer growth opportunities for their investments.

According to the pecking order theory, firms that face information asymmetry and transaction costs prefer to use their retained earnings to invest rather than raise external funds through debt and equity issuances (Mulyani et al., 2016; Setiawan & Phua, 2013). Highly profitable firms tend to have highly internally generated funds available for reinvestment and less likely to have their internal funds diminish, so they are more willing to pay dividends generously.

A high degree of debt in a firm’s capital exposes the firm to higher financial risk related to the inability to service the debt. In the realm of the pecking order theory, having fixed financial charges and paying generous dividends at the same time may lead firms to seek external funding more often and this leads to reductions on firms’ dividend level payments (Mahdzan et al., 2016; Mulyani et al., 2016). To ensure their survivability as ongoing concerns, firms with high financial leverage have fewer incentives to pay generous dividends.

Asymmetric information and the dividend signalling theory imply that high growth firms are in dire need of more capital to expand their operations (Gul, 1999). The necessity to convince investors and gain their trust is an urgent matter for firms that are most likely to enter the capital markets for raising new funds. Sawicki (2009), as well as Setiawan and Phua (2013), noted that the high level of dividend payments provided a signal to investors that the firms had good prospects in the future.

On the other hand, according to the agency of free cash flow theory of Jensen (1986) and Lang and Litzenberger (1989) and the pecking order theory of Myers and Majluf (1984), firms with high growth and investment opportunities have no motivations to pay generous dividends because they have a high demand for the internally generated funds to finance those investments, while firms with slow growth and fewer investment opportunities are in the position to pay more dividends due to readily available funds and the need to control for overinvestment problems.

Lin et al. (2012) argued that firms’ decisions to increase and decrease dividends across periods depend on whether market placed positive (negative) dividend
premiums in those periods. Observations across periods may find indirect evidence that an investor’s preference toward dividends is not steady due to the economy, demography, taste, or investor behaviour changes.

In formulating dividend policies, companies are more likely to take external and internal factors into consideration. This study used dividend yield because it allowed a firm to see dividend payments as a part of total returns on investing in a stock and provides a single measure to evaluate an internal factor (dividend payment) and an external factor (stock price) at the same time.

MATERIALS AND METHODS

The initial sample of this study included all firms in manufacturing industries that are continuously listed in the Indonesia Stock Exchange (IDX) from the periods of 2009 to 2013. The stock exchange classifies manufacturing firms into three industry sectors. These sectors are Basic and Chemical Industry, Miscellaneous, and Consumer Goods Industry sectors. There were 61 companies in Basic and Chemical, 42 companies in Miscellaneous, and 38 companies in Consumer Goods industry sectors in 2013. These 141 companies made up the initial samples, and their financial reports for the five-year period were collected from their websites and the IDX library.

To be included in the final sample, the firms must have data for dividend payments, size, profitability, leverage, and growth for the whole 5-year period. After eliminating some firms that had incomplete data for at least one period, the final sample was a panel data with balanced samples of 111 firms for a total of 555 firm-year observations. This final sample consisted of 51 companies in Basic and Chemical, 34 companies in Miscellaneous, and 26 companies in Consumer Goods industry sectors.

Dividend yields were used to proxy for dividend payments. The yields were found by dividing annual cash dividends with beginning-period stock prices. The independent variables in this study were logged total assets, return on assets (net income divided by total assets), debt to equity ratio (total liabilities divided by book value of equity), and annual sales change (the difference between the current and previous period sales divided by previous period sales). These variables were used to proxy for size, profitability, leverage, and growth respectively. Besides these four independent variables, there were also dummy variables to represent periods. The year 2009 was the base period for the dummies.

Furthermore, the sample in this study was a censored sample since there were two kinds of firms in the final sample; firms that paid dividends (positive cash dividends) and firms that did not pay dividends (zero cash dividends). The appropriate model for such a censored sample is the Tobit model as explained in McDonald and Moffitt (1980) and Long (1997). Also, this study used panel data that introduced a statistical complication such that the observations might be independent across companies but
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not independent within firms. To overcome this statistical problem, this study employed cluster-robust standard errors as suggested in Petersen (2009). This method allows correlations from observations on the same company in different years. The complete model in this study, therefore, is as follows:

\[
\text{Div}_{i,t} = \alpha + \beta_1 \text{Size}_{i,t} + \beta_2 \text{Profit}_{i,t} + \beta_3 \text{Lev}_{i,t} + \beta_4 \text{Grow}_{i,t} + \beta_5 \text{Period}_t + \varepsilon_{i,t}
\]

Where:
- \( \text{Div}_{i,t} \): Dividend yield of firm \( i \) in year \( t \)
- \( \text{Size}_{i,t} \): Log total assets of firm \( i \) in year \( t \)
- \( \text{Profit}_{i,t} \): Returns on assets of firm \( i \) in year \( t \)
- \( \text{Lev}_{i,t} \): Debt to equity ratio of firm \( i \) in year \( t \)
- \( \text{Grow}_{i,t} \): Sales growth from year \( t-1 \) to year \( t \) of firm \( i \)
- \( \text{Period}_t \): Dummy variable to represent the periods from 2009 to 2013, where 2009 is the base period
- \( \varepsilon_{i,t} \): A cluster-robust standard error term

RESULTS AND DISCUSSIONS

Table 1 presents the descriptive statistics for the variables of the regression model in this study. It covers the data of 111 firms from 2009 to 2013 for a total of 555 firm-year observations. The table shows the mean, standard deviation, maximum, and minimum of all the variables.

The dividend yield is the ratio of cash dividends to beginning-period stock price. Size is the log of total assets. Profit is the ratio of net income to total assets. Leverage is the debt to equity ratio. Growth is the annual sales growth.

The mean value of the dividend yield was 2.3% with a standard deviation of 6.2%, and the maximum and minimum values were 75% and 0% respectively. With regard to the minimum value of the dividend yield, 318 of 555 firms did not pay dividends between the 5-year periods of the observation. The mean value of the size (log of total assets) was 27.24 with a variation of 2.14 and 33.36 to 22.48 values of maximum and minimum points. Size appears to be in less variation among the manufacturing firms in the sample. The mean value of the profitability (returns on assets) was 7.51% with a standard deviation of 19.44%, and the maximum and minimum values were 347.5% and -75.6% respectively. The mean value of the leverage (debt to equity ratio) was 177.7% with a variation of 613.9%, and the 7.561% to -3.178% values of maximum

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Max.</th>
<th>Min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dividend Yield</td>
<td>0.023</td>
<td>0.062</td>
<td>0.750</td>
<td>0.000</td>
</tr>
<tr>
<td>Size</td>
<td>27.24</td>
<td>2.14</td>
<td>33.36</td>
<td>22.48</td>
</tr>
<tr>
<td>Profitability</td>
<td>0.0751</td>
<td>0.194</td>
<td>3.475</td>
<td>-0.756</td>
</tr>
<tr>
<td>Leverage</td>
<td>1.777</td>
<td>6.139</td>
<td>75.61</td>
<td>-31.78</td>
</tr>
<tr>
<td>Growth</td>
<td>0.114</td>
<td>0.346</td>
<td>3.407</td>
<td>-0.746</td>
</tr>
</tbody>
</table>

Financial leverage has great variation in the sample and negative numbers in the leverage occur because some firms have negative equities, so that their debt is higher than their total assets. Triady et al. (2016) noted that a larger proportion of assets financed by debt led to a higher financial risk for firms. The last independent variable of the study was firm growth (sales growth), and its mean value was 11.4% with a variation of 34.6% and a maximum value of 340.7% and a minimum value of -74.6%.

Table 2 below depicts the Pearson’s correlation matrix between the financial variables in this study. The table shows all the independent variables, except leverage, have positive relationships with dividend yield. In addition, the table shows low degrees of correlations between the independent variables. This implies the absence of multicollinearity. Further colinearity diagnostics using the Tolerance and Variance Inflated Factor (not reported here) support the results of the Pearson’s correlation coefficients that there is no evidence of any multicollinearity problem in the regression model.

The dividend yield is the ratio of cash dividends to beginning-period stock prices. Size is the log of total assets. Profit is the ratio of net income to total assets. Leverage is the debt to equity ratio. Growth is the annual sales growth.

The results of hypothesis testing are reported in Table 3. The results on testing the relationship between size and dividend yield confirm the expectation that the association is positive and highly significant at the 1% level. The firm life cycle theory implies that large firms are mature firms that have ample amounts of cash and fewer growth opportunities for their investment. The agency cost theory of equity prescribes that large firms run complex operations that hamper the ability of external or minority shareholders to closely monitor a firm’s operations. Similarly, large firms usually have no difficulty to access capital markets and bear fewer transaction costs in raising external funds. The results support the prediction that large firms tend to pay higher dividends than small ones. This finding confirms a study on dividends for Indonesian companies that was conducted by Mulyani et al. (2016) but in contrast to that of Sawicki (2009) and Setiawan and Phua (2013). Sawicki (2009) argued that small and large firms might still want to retain earnings if they had abundant growth opportunities. For the rest of the

<table>
<thead>
<tr>
<th>Variable</th>
<th>Dividend yield</th>
<th>Size</th>
<th>Profitability</th>
<th>Leverage</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dividend Yield</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>0.035</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profitability</td>
<td>0.125</td>
<td>0.283</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leverage</td>
<td>-0.029</td>
<td>-0.113</td>
<td>-0.093</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Growth</td>
<td>0.021</td>
<td>0.143</td>
<td>0.046</td>
<td>0.055</td>
<td>1.000</td>
</tr>
</tbody>
</table>
world, the results are also mixed. A study on Thai firms by Komrattanapanya and Suntrauk (2013) and Persian Gulf country firms by Al-Kuwari (2009) confirmed a positive relationship. Meanwhile, a study on Malaysian firms by Mahdzan et al. (2016); a study on Danish firms by Hedensted and Raaballe (2008); and a study on Hong Kong firms by Zhang and Jia (2014) found a negative relationship. Different from those studies, a study on firms from the U.S. and developing countries (South Korea, India, Malaysia, Thailand, Zimbabwe, Jordan, Pakistan, and Turkey) by Aivazian et al. (2003) found that size did not affect dividend payments.

\[
\text{Div}_{it} = \alpha + \beta_1 \text{Size}_{it} + \beta_2 \text{Profit}_{it} + \beta_3 \text{Lev}_{it} + \beta_4 \text{Grow}_{it} + \beta_5 \text{Period}_t + \varepsilon_i
\]

Div is the ratio of cash dividends to beginning-period stock price. Size is the log of total assets. Profit is the ratio of net income to total assets. Lev is the debt to equity ratio. Growth is the annual sales growth. A period is a dummy variable for 2009 to 2013, where 2009 is the base period. The parameters of the model are estimated using a Tobit regression analysis. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels respectively, and it is based on a one-tailed test if the expected sign on the hypothesis is directional, and is based on a two-tailed test otherwise. t-statistics are adjusted for in-company dependence by using clustered robust standard errors.

Table 3 shows that, as expected, there is a positive association between profitability and dividend yield, and this association is significant at the 10% level. The more profitable the company, the higher the dividend yield received is by investors. The pecking order theory prescribes that firms, facing information asymmetry and transaction costs, tend to use retained earnings for investment purposes. Highly profitable firms are in a position to have sufficient internally generated funds for both investment and generous dividend payments without incurring the need to obtain costly external financing. The importance of profitability in determining a dividend level is also documented by Baker and Powel (2012) through a survey on executives in Indonesia, where profitability measures are ranked as the top three factors in influencing
dividends. This positive relationship is also confirmed by studies on dividends for Indonesian firms conducted by Setiawan and Phua (2013), as well as Mulyani et al. (2016).

Sawicki (2009), however, found no relationship between profitability and dividend level. She attributed this finding to the volatility of firms’ profitability around the Great East Asian Financial Crisis. The positive relationship between profitability and dividends is currently also found for firms in the US and developing countries (Aivazian et al., 2003), Ghana (Amidu & Abor, 2006), Denmark (Hedensted & Raaballe, 2007), Persian Gulf countries (Al-Kuwari, 2009), Thailand (Komrattanapanya & Suntrauk, 2013), and Hong Kong (Zhang & Jia, 2014). In contrast, Mahdzan et al. (2016) found that for Malaysian firms, the relationship was influenced by the industry variation, so that it could have a significant negative or positive relationship between the two.

The agency cost of free cash flow, the pecking order, and signalling theories prescribe that firms with high financial leverage have fewer incentives to pay generous dividends because debt provides a control mechanism and it requires fixed payments that lead toward raising costly external capital due to transaction costs and the emission of unfavourable news regarding the future of firms. The result of a test on the relationship between leverage and dividend payments confirms the theories that there is a negative relationship between the variables. This relationship is significant at the 5% level. Current studies on the subject for firms in Indonesia, Thailand, Hong Kong, Persian Gulf countries, the USA, and other developing countries, and Malaysia also find the same result that the relationship is negative (Al-Kuwari, 2009; Aivazian et al., 2003; Komrattanapanya & Suntrauk, 2013; Mahdzan et al., 2016; Mulyani et al., 2016; Zhang & Jia, 2014).

The next test relates firm growth with dividend level. As mentioned previously, the hypothesis on the relationship is unidirectional because there are conflicting predictions regarding the relationship. The agency of the free cash flow theory and the pecking order theory predict that the relationship is negative because of the high demand for the internally generated funds. On the other hand, the asymmetric information and dividend signalling theory prescribes that the relationship is inverse because high growth firms are most likely to raise external capital, so they need to convince investors by paying high dividends so that they have good prospects.

Table 3 shows that the relationship between firm growth and dividends is found to be positive and significant at the 5% level. The results for Indonesian firms show that the relationship is positive, which is also documented by Sawicki (2009) as well as Setiawan and Phua (2013). For firms in Ghana and Thailand, however, the relationship is negative as predicted by the agency of the free cash flow theory and the pecking order theory for companies.
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(Amidu & Abor, 2006; Komrattanapanya & Suntrauk, 2013), and there is no relationship between the variables for companies in Malaysia, Persian Gulf countries, and Hong Kong (Al-Kuwari, 2009; Mahdzan et al., 2016; Zhang & Jia, 2014).

Finally, Table 3 also reveals that inter-periods have an impact on dividend yield. Except for 2010, in 2011, 2012, and 2013, on average, companies had fewer dividend yields than in 2009. All the differences are significant at the 1% level. The results provide preliminary evidence on the extended version of the catering theory of the dividend policy that the investors’ preference towards dividends may change across periods and, accordingly, firms adjust their dividend policies to match the changes, as found in Lin et al. (2012).

CONCLUSIONS

The objective of this study was to investigate the factors that determine the dividend policies of manufacturing firms listed in the Indonesia Stock Exchange. The investigation was conducted on panel data with a balanced sample of 111 firms for a total of 555 firm-year observations. A Tobit regression analysis with cluster-robust standard errors was employed to find evidence on the relationship between dependent and independent variables. The independent variable was dividend yield and the independent variables were firm size, profitability, financial leverage, sales growth, and the dummy variable to represent the inter-period factor. The analysis found that firm size, profitability, and sales growth positively influenced the magnitude of dividends paid relative to stock prices received by shareholders. On the other hand, it was also found that financial leverage negatively affected dividends. A high degree of debt in a firm necessitates the firm to maintain an internal cash flow to avoid the costly transaction costs of raising external funds. Another result suggests the level of dividends varies across time. There is indirect evidence that investors’ preference towards dividends may change across periods.

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