ANALYSIS OF DETERMINANTS OF CAPITAL STRUCTURE OF PLANTATION COMPANIES IN INDONESIA
(Case Study Public Listed Plantation Companies Q1 2006 - Q4 2012)

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Abstract- This research focuses on capital structure with the objective to examine the effect of several determinants of capital structure of listed plantation companies in Indonesia. The factors influencing capital structure analyzed in this research are asset tangibility, growth, firm size, and profitability. The research is conducted by observing financial data of 10 listed plantation companies in Indonesia from period 2006 the earliest to 2012 the latest. Panel data regression technique is used in this research and random effects assumption is chosen as the best to be applied on the capital structure determinants model, and so the model is constructed by using Generalized Least Square method. The capital structure determinants model constructed in this research shows that asset tangibility and growth of the firm (represented by asset growth) do not have significant effect on debt to equity ratio. It is most likely that these two aspects are not taken into account by listed plantation companies in Indonesia in making their capital structure decision. However, firm size (represented by natural logarithm of total asset) and profitability (with net profit margin as proxy) are proven to have significant negative effect on capital structure. If firm size increases by 10%, debt to equity ratio will decrease by 1.42%; and if profitability increases by 10%, debt to equity ratio will decrease by 4.87%. From the result of this research, it can be concluded that only firm size and profitability that have significant relationship with capital structure for the case of listed plantation companies in Indonesia. These aspects thus should be put into consideration by management and investor or other concerned party when assessing capital structure policy of the companies.

Keywords: Capital Structure, Plantation Companies, Asset Tangibility, Growth, Firm Size, Profitability, Panel Data Regression

Introduction

One of the principles in corporate finance is the financing principle (Damodaran, 2001). It deals with how a firm finances its investments to run its business. Financing source for a firm can be classified into two types: debt (borrowed money) and equity (owner's fund). Debt and equity each has its own advantages and disadvantages. Therefore, a firm has to decide how much debt and equity that it will use to take advantage from the mix. This kind of decision is called capital structure decision.

Several factors influence this financial decision. According to Gitman, "The level of debt (financial leverage) that is acceptable for one industry or line of business can be highly risky in another, because different industries and lines of business have different operating characteristics" (2009). These different operating characteristics can be depicted in financial ratios such as asset tangibility and growth. Gitman also continued to state, "Differences in debt positions are also likely to exist within an industry or line of business" (2009). An industry may consist of firms with different sizes, which cause them to apply different level of debt. Differences in firms of an industry can also be seen from different level of profitability.

As a country with competitive advantage in its natural resources and climate, plantation is a potential main sector industry in Indonesia. Due to the characteristic of the business, companies in plantation industry need a large amount of fund for its investments. Financing decision becomes even more crucial for these companies as a lot is at stake. Public listed plantation companies have more access to issue debt and stock, making capital structure decision to be more flexible yet more complex at the same time. Therefore, this research focuses observing the influence of several factors on capital structure of public listed plantation companies in Indonesia.

Literature Review

Capital Structure
Ross, Westerfield, & Jordan defined a firm's capital structure in their book Corporate Finance Fundamentals as " ...the specific mixture of long-term debt and equity the firm uses to finance its operations" (2008). Non-current liabilities or long-term debt can come from bank loans and bonds. On the other hand, fund included as equity comes in the forms of preferred stock, common stock, and retained earnings. In this research, debt to equity ratio will be used to describe a firm's capital structure.

$$\text{Debt to Equity Ratio (DER)} = \frac{\text{Long} - \text{term Debt}}{\text{Total Equity}}$$

Trade Off Theory
Debt gives firm tax benefit while at the same time also increases the firm's financial risk. Consequently, it will be best for firm to make the most of its capital structure by noticing the trade off between the benefit and loss incurred from debt. Ross, Westerfield, & Jordan specified the theory as follow:

> "It says that firms borrow up to the point where the tax benefit from an extra dollar in debt is exactly equal to the cost that comes from the increased probability of financial distress. We call this the static theory because it assumes that the firm is fixed in terms of its assets and operations and it considers only possible changes in debt-equity ratio" (2008).

Pecking Order Theory
According to this theory, firms tend to have financing hierarchy where they prefer internal financing first whenever possible, will issue debt if necessary, and equity as a last resort (Ross, Westerfield, &Jordan 2008). This kind of hierarchy is formed due to some reasons, elaborated by Damodaran (2001). It is likely that management of a firm value flexibility and control which are reduced if they choose to use debt and stock. Also, using internal financing means not having to pay any issuance cost, unlike external financing, where issuance cost of equity is larger than that of debt. Additionally, firms want to prevent underpricing or overpricing of their securities due to the existence of asymmetric information.

Asset Tangibility and Capital Structure
Firms holding more tangible assets have greater access to borrow money. This is because tangible assets can be used as collateral, which is a secured payment if the firm becomes incapable of paying back its debt. Besides being in any creditor's favor, collateral is also beneficial for the firm as it can prevent the firm from having to go bankrupt when debt cannot be paid (Murhadi, 2011). Therefore, higher tangibility of a firm's assets is supposedly followed by higher level of debt. This positive relationship between asset tangibility and capital structure has been studied and proven by Hadianto (2008), Mas'ud (2008), Kartika (2009), Murhadi (2011), and Munawar (2012). Asset tangibility can be measured by using this formula below.

$$\text{Asset Tangibility} = \frac{\text{Fixed Asset}}{\text{Total Asset}}$$

Growth and Capital Structure
Titman & Wessels explained the relationship between growth and capital structure as follow:

> "...equity-controlled firms have a tendency to invest suboptimally to expropriate wealth from the firm's bondholders. The cost associated with this agency relationship is likely to be higher for firms in growing industries, which have more flexibility in their choice of future investments. Expected future growth should thus be negatively related to long-term debt levels" (1988).

The results of studies conducted by Kesuma (2009) and Murhadi (2011) are consistent with this proposition of negative relationship between growth and capital structure. The growth of a firm can be seen by measuring how much its total assets increase from time to time. The calculation of growth in asset during period t is presented below.

$$\text{Growth in Asset} = \frac{\text{Total Asset}_t - \text{Total Asset}_{t-1}}{\text{Total Asset}_{t-1}}$$

Firm Size and Capital Structure
As a firm becomes larger, it has more capability to bear interest expense that comes from debt. It can issue more debt before actually confronted by severe bankruptcy risk. Therefore, the size of a firm is expected to have a positive relationship with capital structure. This is consistent with what Titman & Wessels stated "... relatively large firms tend to be more diversified and less prone to bankruptcy. These arguments suggest that large firms should be more highly leveraged" (1988). Mas'ud (2008), Kartika (2009), Murhadi (2011), and Yuliati (2011) also found conforming results through their researches. The size of a firm itself can be reflected by the firm's total asset. As the total asset usually comes in a very large number, its natural logarithm is used in this research.

$$\text{Firm Size} = \text{In Total Asset}$$

Profitability and Capital Structure
Pecking order theory implies that high profitable firms will use less debt as their financing resources. With higher profitability, a firm is more capable of fulfilling its needs of financing by using internal source of fund. Firms will prefer to do so whenever they can to avoid the costs related to the issuance of securities. This negative relationship between profitability and capital structure is evidenced in the studies done by Titman & Wessels (1988), Nugroho (2006), Indahningrum & Handayani (2009), dan Firnanti (2011). Profitability can be measured by one of the best known and most widely used financial ratios below (Ross, Westerfield, & Jordan 2008).

$$\text{Net Profit Margin} = \frac{\text{Net Income}}{\text{Sales}}$$

Methodology

The population of this research is all plantation companies that are listed in Indonesian Stock Exchange per year 2012. In this case, there are 11 companies included in the population. Then, purposive sampling, sample selection based on special consideration and criterion is used. The criterion itself is for the companies to have its quarterly financial data (financial reports and stock returns) during the observed period in this research (2006-2012) available. Therefore, only 10 companies serve as sample in this research.

Table 1. Sample Data

No	Name	IPO Date
1	Bakrie Sumatera Plantation Tbk. (UNSP)	6-Mar-1990
2	Sinar Mas Agro Resources and Technology Tbk. (SMAR)	20-Nov-1992
3	PP London Sumatera Indonesia (LSIP)	5-Jul-1996
4	Astra Agro Lestari Tbk. (AALI)	9-Dec-1997
5	Tunas Baru Lampung Tbk. (TBLA)	14-Feb-2000
6	Sampoerna Agro Tbk. (SGRO)	18-Jun-2007
7	Gozco Plantation Tbk. (GZCO)	15-May-2008
8	BW Plantation Tbk. (BWPT)	27-Oct-2009
9	Jaya Agra Wattie Tbk. (JAWA)	30-May-2011
10	Salim Ivomas Pratama Tbk. (SIMP)	9-Jun-2011

The data used in this research are secondary data in the forms of companies' quarterly financial reports. The data comes in the form of panel data as it combines cross-sectional and time-series data, where individuals (in this case, companies) are observed at several points in time (Schmidheiny, 2012). However, some companies included in the sample of this research only started to be listed on Indonesian Stock Exchange after 2006 and each on different period. For these companies, financial data used are from the period they conducted IPO so that their financial data are available for research. Therefore, the panel data is unbalanced. Stata 12 software is used to conduct this research analysis as it facilitates regression for unbalanced panel data by weight adjustment in the coefficients estimation process.

To take advantage of the panel data form, panel data regression techniques are used in observing the relationships analyzed in this research. Panel data regression is able to capture the individual heterogeneity, which might occur due to differences across companies, or variables that change over time but not across entities (Torres-Reyna, n.d.). Panel data regression will isolate the effect of these unobserved variables (individual effects), so that better estimation of the model coefficients can be obtained (Sanjoyo, 2009).

There are three techniques of panel data regression based on the assumption regarding individual effects. In common effects approach, it is assumed that the behavior of each individual is the same for any time period. In other words, it takes neither individual nor time dimension into account (Endri, 2011). It only combines the cross sectional and time series data into a pool of data, which then used to estimate a model. The estimation for this approach is conducted by using Pooled Least Square (PLS) method (Fadly, 2012).

The assumption for fixed effects approach is that each entity has different individual effect yet is constant over time. These individual differences are shown in different intercepts for each entity. By excluding those time-invariant characteristics, the independent variables' net effects can be examined (Torres-Reyna, n.d.). The estimation of this model is conducted by using Least Squares Dummy Variable (LSDV) regression (Park, 2011).

For the case in which some unobserved variables are constant over time but vary between entities, and others are fixed between entities but vary over time, random effects technique is best used. Also, it is assumed that the individual-specific effect is a random variable that is uncorrelated with the independent variables (Schmidheiny, 2012). Therefore, the individual effects are shown through errors instead of intercepts. Generalized Least Squares (GLS) method is used to construct the model.

As there are three possible models for panel data regression, the most suitable one needs to be chosen. Figure 1 below describes the sequences of tests to determine the best technique to be used in a research as summarized by Fadly (2013).

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                    ┌──────────────────┐
           Fixed    │  Fixed vs Common │   Common
                    └──────────────────┘
                          F Test
        ┌──────────────────┐      ┌──────────────────┐
        │  Fixed vs Random │      │ Common vs Random │
        └──────────────────┘      └──────────────────┘
              Hausman Test              LM Test
        ┌────────┐  ┌────────┐    ┌────────┐  ┌────────┐
        │ Fixed  │  │ Random │    │ Common │  │ Random │
        └────────┘  └────────┘    └────────┘  └────────┘
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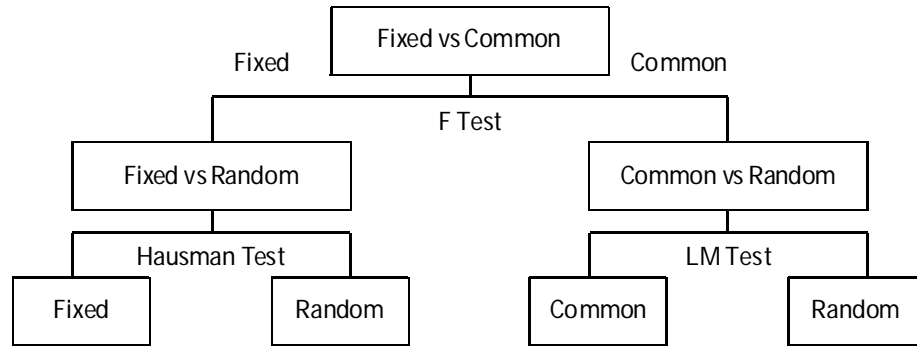
Figure 1 Panel Data Regression Technique Selection Sequences

Figure 2 below illustrates the conceptual framework of this research. There are four determinants of capital structure which will be analyzed in this research: asset tangibility, growth, firm size, and profitability. These financial aspects are expected to have influence on the companies' capital structure. According to this framework, capital structure is the dependent variable in the research model. Asset tangibility, growth, firm size, and profitability become the independent variables which relationships with the dependent variable are analyzed. Below is the list of the hypotheses for the relationships analyzed in this research:

1. Asset tangibility and capital structure
   H_0: Asset tangibility has no or has a negative relationship with capital structure.
   H_1: Asset tangibility has a positive relationship with capital structure.

2. Growth and capital structure
   H_0: Growth has no or has a positive relationship with capital structure.
   H_1: Growth has a negative relationship with capital structure.

3. Firm size and capital structure
   H_0: Firm size has no or has a negative relationship with capital structure.
   H_1: Firm size has a positive relationship with capital structure.

4. Profitability and capital structure
   H_0: Profitability has no or has a positive relationship with capital structure.
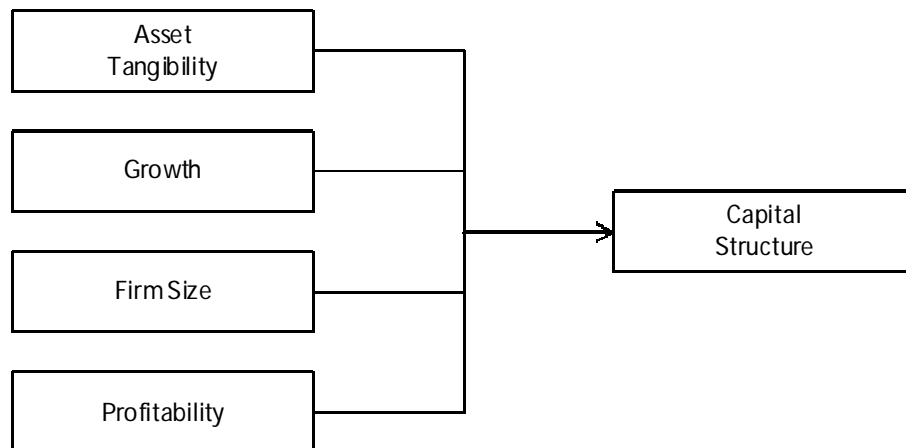 H_1: Profitability has a negative relationship with capital structure.

Figure 2. Conceptual Framework

Data Analysis

For the model, selection of the most suitable estimation method is conducted. The first step for panel data regression method selection is to test whether fixed effects is better applied than the common effects assumption. This can be done by seeing the result of F test, which is shown along with the result of model estimation by using fixed effects. The outputs of the model estimation using fixed effects for the model is shown in Appendix. From the output, it can be seen that the Prob > F score (0.000) of the F test is lower than the chosen significance level (0.05). Therefore, the null hypothesis of F test that the individual effects equal to zero is rejected thus the model is better estimated by applying fixed effects assumption.

Having come to the conclusion that fixed effects is better than common effects for the model, the fixed effects then has to be compared with random effects. First, the model is once more estimated, but this time by using random effects. Both the model estimation results by using fixed and random effects then are used to conduct Hausman test. The output of the model estimation using random effects and the result of Hausman test is shown in Appendix. The result of the test shows Prob>chi2 score is higher than 0.05, which means that the null hypothesis is not rejected. The test proves that difference in coefficients is not systematic. Consequently, random effects method is more suitable for the model and it should be estimated by using Generalized Least Squares method.

Accordingly, the models can be defined as follow,

$$DER_{it} = a + ßtang_{it} + ßgrowth_{it} - ßsize_{it} - ßnpm_{it} + (u_i + e_{it})$$

The results of the models estimation are as follow,

$$DER_{it} = a + 0.2295262tang_{it} + 0.035701growth_{it} - 0.1421093size_{it} - 0.4865366npm_{it} + (u_i + e_{it})$$

Before drawing conclusion from a linear regression model, it has to be checked how the model satisfy the classical assumption requirements. First, for the conclusion of the hypotheses testing to be valid, the normality of the research model in panel data regression needs to be tested (Sanjoyo, 2009). It is expected that the residuals of a model are distributed normally as a sign that there is no significant influence from variables that are not included in the model. The normality can be examined by looking at the normal P-P plot of the residuals of the model. The assumption of normality is fulfilled if the dots are distributed align with the diagonal line of the plot.
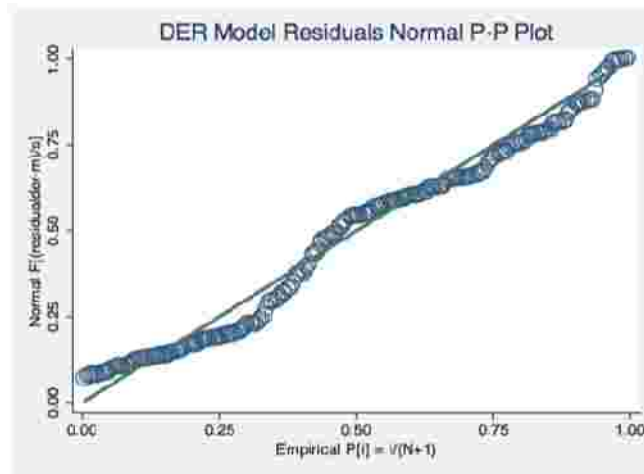

Figure 3 Normal P-P Plot of DER Model Residuals

To observe the models' residuals distribution, their normal P-P plots are presented in Figure 3 above. It can be seen that the dots form a pattern that goes along with the diagonal line. There are some deviations in the form of curves below and above the line. It indicates that there might be some data which values are quite different from the rest. However, overall it can be concluded that the distribution of the model residuals is close enough to a normal distribution pattern.

One of the concerns in linear regression with two or more independent variables is the existence of correlation between the independent variables called multicollinearity. In a panel data, the problem of multicollinearity is less likely to happen as the cross-section dimension adds a lot of variability (Baltagi, 2005). Though the variables might be correlated when only time series data taken into account, once the cross sectional data is added, multicollinearity will not be a problem anymore, thus the test does not need to be conducted (Sanjoyo, 2008).

Other concerns in linear regression are the problems of autocorrelation and heteroscedasticity. Residuals in a linear regression model are expected to not have serial correlation and to have equal variance or to be homoscedastic (Gujarati, 2004). Autocorrelation can be examined by plotting the residuals of the model on its first lag. The absence of systematic pattern to the residuals indicates zero correlation (Gujarati, 2004). On the other hand, heteroscedasticity can be tested by using Breusch-Pagan test of heteroscedasticity with the null hypothesis of constant variance.

Due to the utilization of Generalized Least Squares method in a random effects model estimation, problems of autocorrelation and heteroscedasticity are already taken care of as the method itself is actually a solution for autocorrelation and heteroscedasticity problems (Ruslan, 2011). Therefore, there is no need to conduct the autocorrelation and heteroscedasticity assumption tests for this particular model.

Next, the goodness of fit of the models needs to be examined. It indicates the extent that the model fits data (Park, 2011). It can be analyzed by looking at several statistic measurements. To see whether the model is capable of capturing the relationship of dependent and independent variables, the result of the F test needs to be analyzed. For a random effects model, similar result of the test (Prob > F) is represented by Prob > chi2 score. From Appendix, it can be seen that the value of Prob > chi2 of the DER model estimation (0.000) is lower than the 0.05 significance level. Therefore, the null hypothesis that all of the independent variables' coefficients equal to zero is rejected. Thus, the model can explain the relationship between the independent and dependent variables.

Rho ratio explains the proportion of individual specific error variance to the total (composite) error variance. A large ratio means that a large proportion of the total error variance is made up of individual specific error variance. Therefore, this ratio may be interpreted as a goodness of fit of random effects model (Park, 2011). As the model is a random effects model, this ratio is examined. The output of the model estimation shows a rho score of 0.64638594. This means that as much as 65 percent of the total error variance can be explained by the individual specific error.

Then, based on the output of the model, previously suggested hypotheses will be tested and the results will be analyzed below. Table 2 summarizes the model output while the details can be seen in Appendix DER Model Estimation Output Using Random Effects. P > | z | represents the p-value of two-tailed hypothesis test. The p-value needed for one-tailed hypothesis test of each independent variable can be derived from it (Stata, 2013).

Table 2 Independent Variables Output

Variable	Coefficient	$P > \lvert z \rvert$
tang	0.2295262	0.251
growth	0.035701	0.770
size	-0.1421093	0.000
npm	-0.4865366	0.015

Asset Tangibility and Capital Structure

Asset tangibility, represented by variable "tang" has a positive estimated coefficient value, and the null hypothesis for the variable is that it has no or has a negative relationship with capital structure (H_0 : ßtang =0). Thus, p-value for the one-sided hypothesis can be calculated as follows:

p-value = p-value given in regression output/2=0.251/2=0.1255

As the p-value is higher than 0.05, the null hypothesis is not rejected. The coefficient for asset tangibility is less than or equal to zero. Then, to test whether the coefficient is equal to zero (H_0 : ßtang =0), the p-value to be considered is as follows:

p-value = p-value given in regression =0.251

The p-value is higher than 0.05, thus the null hypothesis that the variable coefficient equals to zero is not rejected. It can be concluded that there is no significant relationship between asset tangibility and capital structure of this research object. This contradicts the proposition based on theories that asset tangibility should have a positive effect on debt to equity ratio. As tangible assets can be used as collateral, the more tangible asset a firm has, the more capability the firm has to use debt. However, from the result of this research, it seems that asset tangibility is not an important factor for public listed plantation companies in determining their level of debt.

Growth and Capital Structure

Growth, represented by variable "growth" has a positive estimated coefficient value, and the null hypothesis for the variable is that it has no or has a positive relationship with capital structure (H_0 : ßgrowth=0). Thus, p-value for the one-sided hypothesis can be calculated as follows:

p-value = 1- (p-value given in regression output/2)=1- (0.770/2)=0.615

As the p-value is higher than 0.05, the null hypothesis is not rejected. The coefficient for growth is more than or equal to zero. Then, to test whether the coefficient is equal to zero (H_0 : ßgrowth =0), the p-value to be considered is as follows:

p-value = p-value given in regression =0.770

The p-value is higher than 0.05, thus the null hypothesis that the variable coefficient equals to zero is not rejected. It indicates that firm growth is not proven to have a significant effect on the firm's capital structure. Titman & Wessels (1988) suggested that expected future growth should be negatively related to long-term debt levels due to the existence of agency problems between equity holders and bondholders. Nevertheless, as for this research object, there is no significant effect of growth found on capital structure. Growth does not seem to be a determinant of capital structure for public listed plantation companies in Indonesia.

Firm Size and Capital Structure
Firm size, represented by variable "size" has a negative estimated coefficient value, and the null hypothesis for the variable is that it has no or has a negative relationship with capital structure (H_0 : βsize=0). Thus, p-value for the one-sided hypothesis can be calculated as follows:

p-value = 1- (p-value given in regression output/2)=1- (0.000/2)=1

As the p-value is higher than 0.05, the null hypothesis is not rejected. The coefficient for asset tangibility is less than or equal to zero. Then, to test whether the coefficient is equal to zero (H_0 : βsize =0), the p-value to be considered is as follows:

p-value = p-value given in regression =0.000

The p-value is lower than 0.05, thus the null hypothesis that the variable coefficient equals to zero is rejected. It can be concluded that firm size has a negative effect on firm's debt level. Shown by its coefficient value (-0.1421093), if the firm size increases by 10 percent, the debt to equity ratio will decrease by 1.42 percent. This means that the proposition of a positive relationship with capital structure does not apply. Even though bigger size of firm comes with higher capability of bearing debt, the result shows that increase in firm size will be followed by decrease in debt level. This is actually consistent with pecking order theory. Firms prefer to utilize internal financing, thus the more they can afford it, the less external financing they will need. This seems to be the case for Indonesian public listed plantation companies.

Profitability and Capital Structure
Profitability, represented by variable "npm" has a negative estimated coefficient value, and the null hypothesis for the variable is that it has no or has a positive relationship with capital structure (H_0 : βnpm=0). Thus, p-value for the one-sided hypothesis can be calculated as follows:

p-value = p-value given in regression output/2=0.015/2=0.0075

As the p-value is lower than 0.05, the null hypothesis is rejected. Therefore, the alternative hypothesis that the variable has negative relationship with capital structure (H_0 : βnpm <0) applies. The negative coefficient value (-0.4865366) indicates that when profitability increase by 10 percent, debt to equity ratio will decrease by 4.87 percent. Consequently, the proposition that profitability has a negative relationship with capital structure applies to the object of this research. In line with pecking order theory, firms will not use debt unless they do not have enough internal source of fund. With an increase in profitability, a firm is more likely to have more fund for internal financing, thus they will need less debt. The result of this research shows that it is most likely that public listed plantation companies in Indonesia apply this theory in practice.

Conclusion and Recommendation

Conclusion
This research focuses on capital structure of listed plantation companies in Indonesia. Observed in this research are the determinants of capital structure with asset tangibility, growth, firm size, and profitability as observed variables. The model constructed in this research explains the relationship that each of those financial aspects has with capital structure of the companies:
1. Asset tangibility does not have significant relationship with capital structure.
2. Growth does not have significant relationship with capital structure.
3. Firm size has a significant negative relationship with capital structure.
4. Profitability has a significant negative relationship with capital structure.

Both asset tangibility and growth do not have significant effect on firm's debt level. It is most likely that these two aspects are not taken into account by listed plantation companies in Indonesia in making their capital structure decision. On the other hand, both firm size and profitability affect debt level negatively, in that if firm size increases by 10%, debt to equity ratio will decrease by 1.42%, and if profitability increases by 10%, debt to equity ratio will decrease by 4.87%. It seems that these two aspects determines how the companies decide on their capital structure.

Recommendation

From the result of this research, it can be concluded that only firm size and profitability that have significant relationship with capital structure for the case of listed plantation companies in Indonesia. These aspects thus should be put into consideration by management and investor or other concerned party when assessing capital structure policy of the companies. On the other hand, different and more accurate result might be obtained if larger span of sample, observed period, observed variables, and variable proxies are used. Further research on this topic can even be conducted by using different method or by observing different object to obtain more comprehension about capital structure field.

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APPENDIX
Model Estimation and Test Output

DER Model Estimation Output Using Fixed Effects

```
Fixed-effects (within) regression          Number of obs     =      204
Group variable: company                    Number of groups  =       10

R-sq:  within  = 0.1127                     Obs per group: min =       6
       between = 0.1214                                    avg =     20.4
       overall = 0.1336                                    max =       28

                                            F(4,190)          =     6.03
corr(u_i, Xb)  = 0.1048                     Prob > F          =   0.0001
```

der	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
tang	.2054591	.2056418	1.00	0.319	-.2001753	.6110934
growth	.020974	.1226854	0.17	0.864	-.2210265	.2629745
size	-.1427204	.0330675	-4.32	0.000	-.2079469	-.0774939
npm	-.478448	.2041317	-2.34	0.020	-.8811034	-.0757925
_cons	2.630202	.5143211	5.11	0.000	1.615689	3.644715
sigma_u	.29827462					
sigma_e	.21260647					
rho	.66310084	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(9, 190) =    38.84          Prob > F = 0.0000
```

DER Model Estimation Output Using Random Effects

```
Random-effects GLS regression                Number of obs      =      204
Group variable: company                      Number of groups   =       10

R-sq:  within  = 0.1126                       Obs per group: min =        6
       between = 0.1267                                      avg =     20.4
       overall = 0.1367                                      max =       28

                                              Wald chi2(4)       =    25.40
corr(u_i, X)   = 0 (assumed)                  Prob > chi2        =   0.0000
```

der	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
tang	.2295262	.1997422	1.15	0.251	-.1619612	.6210137
growth	.035701	.1223528	0.29	0.770	-.204106	.2755081
size	-.1421093	.0319328	-4.45	0.000	-.2046965	-.0795221
npm	-.4865366	.199789	-2.44	0.015	-.8781159	-.0949574
_cons	2.624987	.510605	5.14	0.000	1.624219	3.625754

sigma_u	.28744692	
sigma_e	.21260647	
rho	.64638594	(fraction of variance due to u_i)

DER Model Hausman Test Output

	——— Coefficients ———			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fixed	.	Difference	S.E.
tang	.2054591	.2295262	-.0240672	.0489043
growth	.020974	.035701	-.014727	.0090284
size	-.1427204	-.1421093	-.0006111	.0085878
npm	-.478448	-.4865366	.0080887	.0418819

```
                      b = consistent under Ho and Ha; obtained from xtreg
         B = inconsistent under Ha, efficient under Ho; obtained from xtreg

     Test:  Ho:  difference in coefficients not systematic

                 chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                         =        1.97
             Prob>chi2 =        0.7419
             (V_b-V_B is not positive definite)
```