The Influence of Investment Opportunity Set (IOS) To Cost Of Equity Capital (COEC) at Company’s LQ45

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Abstract
The aim of this study is to prove the influence of Investment Opportunity Set (IOS) to Cost of Equity Capital (COEC) at Company's LQ45
Population in this study involve all companies listed in the Indonesian Stock Exchange, during 2006 to 2010. Samples consisting of 56 companies were recruited based purpose sampling method. Hypothesis testing was conducted by utilizing SmartsPLS Version 2.0
Finding of this study indicates that Investment Opportunity Set (IOS) has negative significant effect to Cost Of Equity Capital (COEC) at Company's LQ45 with value of -0.283

Keywords : Investment Opportunity Set (IOS), Cost of Equity Capital (COEC)

I. INTRODUCTION
Every business entity expects to be always going concern in running its business. It is expected that steady growth and periodically increasing company asset values will be achieved in line with the company’s expectations or forecasts. The company growth, according to Smith and Watts (1992) can be proxied by using various combinations of Investments Opportunity Set (IOS). The essence of company growth is the existence of investment opportunities that can generate profits (Chung & Charoenwong 1991). According to Gaver & Gaver (1993), growth options for a company is inherently unobservable. Due to its unobservability, IOS requires a proxy (Hartono, 1999). IOS values can be obtained by combining various types of proxies implying that at site asset values, including the book values of assets or equities and the company growth opportunity in the future.
There are several IOS proxies adopted in some studies, among others, 1) by applying a single ratio IOS proxy in the research model, such as BE / MVE (book to market value ratio) i.e. the ratio of equity book value to market value of equity (Collins and Kothari, 1989), 2) by adopting a statistical method of factor analysis to obtain factor scores as IOS general index
(Gaver & Gaver 1993), as well as the rank scores of these factors to classify the growing and non-growing companies (Gaver & Gaver 1993; Sami et al. 1999); and 3) by performing sensitivity analysis on individual ratio as IOS alternative proxy, and then developing instrumental variable as an IOS alternative proxy (Smith & Watts 1992; Hartono 1999).

Several types of IOS proxies have been proved to have a relationship with the funding policy and dividend policy. The result of Smith & Watts’ (1992) study indicates that some types of IOS proxies have been revealed to have a relationship with the funding policy and dividend policy. The study results of Smith & Watts (1992) and Gaver & Gaver (1993) also show that the various IOS levels among companies turn out to be one of determinants in differentiating funding and dividend policies among companies, i.e. the growing companies tend to have relatively lower debt ratios in capital structure (leverage) and dividends compared the non-growing ones.

Various studies on IOS has successfully proved that IOS becomes the proxy of the company growth and it is associated with various variables of company policies, including funding policy or debt structure, dividend policy, leasing policy, and compensation policy. Sami et al. (1999) show that IOS theory has higher explanatory power in terms of funding and compensation policies rather than dividend aspects.

The questions to answer in this study involve whether the IOS value as the proxy of the company growth has higher relationship and correlation with the market reaction, which the investors respond through changes in stock returns. The correlation value of IOS proxy tested in this study involve the IOS proxies of ratio model, i.e. market to book value ratio found in previous studies as the most valid variable as the growth proxy.

II. LITERATURE REVIEW

The Concept of Cost of Equity Capital

Cost of Equity Capital is estimated based on various approaches, among others, capital asset pricing model (CAPM), earnings growth model, and the dividend yield plus growth rate (dividend growth model). The CAPM approach is more commonly used in capital market theory, particularly, portfolio theory. The earnings growth model approach assumes that in the long run the changes of abnormal earnings growth is equal to zero (Δagr = 0); hence, the cost of equity is total dividend and the change in earnings per share. While the dividend growth model approach is generally used as the foundation of valuation in determining total cash dividends to be paid by the company to its shareholders. In detail, the three approaches in determining the Cost of Equity Capital are as the following:
The Determination of CAPM (Capital Asset Pricing Model)-based Cost of Equity Capital

The standard form of CAPM was firstly developed by Sharpe (1964), Lintner (1965) and Mossin (1969). Therefore, this model is often called as the Sharpe-Lintner-Mossin-type CAPM. As other financial theories, some assumptions are needed to develop this model. The CAPM is an equilibrium model which is connecting two important capital markets, i.e. capital market line (CML) and the security market line (SML). The CML describes the condition that the efficiency of the market portfolio is the optimal portfolio of risky and risk-free assets; hence, investors will apply their asset portfolios in CML. While the SML is the risk-return tradeoff in the capital market equilibrium condition; therefore, investors have to maintain their market portfolios. Therefore, investors require a certain level of return (required rate of return) to cover the relevant risk. Formally, the CAPM links the expected rate of return with the relevant risks (generally measured by beta (β)). Furthermore, individual stock can estimated by estimating beta based on market model (identical to the Single Index Model) using the following equation (Sharpe, 1963):

\[ Ri = \alpha_i + \beta_i RM + \epsilon \]  

(2.1)

where:

- \( Ri \) = return to stock at ith
- \( \alpha_i \) = expected value
- \( RM \) = market return (market index)
- \( \beta_i \) = beta coefficient
- \( \epsilon \) = residual error

Based on the above description, it is concluded that CAPM can be specifically utilized to determine return and portfolio risk and diversification of individual stock investing.

Investment Opportunity Set

The term Investment Opportunity Set, hereinafter abbreviated as IOS, arises after the proposal of Myers (1977) who consider firm value as the acquired combination of assets with investment option in the future. The investment option is an opportunity to grow; however, companies often are not always able to utilize all investment opportunities in the future. For those who can not use these investment opportunities will bear higher expenses than the lost opportunity values.

According to Gaver & Gaver (1993) the future investment options are not merely shown by the existence of projects that research and development activities support, rather the ability of companies to exploit the opportunities to take more advantages compared to other
equivalent companies within its industrial group. This higher capacity of the companies is unobservable. Future investment options are associated with the company growth rate. The company growth is expected to provide a positive aspect for the company, such as the existence of investment opportunity in the future. Smith and Watts (1992) states that the company growth is seen in investment opportunities proxied with various IOS combinations.

The growing companies are not always small companies who are actively conducting research and development. Small companies frequently encounter limited options in defining and running a new project, or in performing available asset restructurization. Large companies tend to dominate position within the industry (Muller 1986, in Gaver & Gaver 1993); hence, they often have competitive advantages in exploring the investment opportunities. The variation of corporate strategy options to acquire competitive advantages as well as the differences of investment decision taken to encounter their competing companies who want to enter the market has created IOS variation on the sectional basis among the companies (Smith & Watts 1992; Keter 1986, in Gaver & Gaver 1993).

Kallapur and Trombley (1999) state that the company IOS is unobservable for the external parties of the company; hence, proxies are required. According to Kallapur and Trombley (1999), there are four types of proxies, including:

1) **Price-based IOS Proxy**

The price-based IOS proxy consists of: (a) the ratio of book to market value of assets, (b) the ratio of book to market value of equity, (c) the ratio of book value of property, (d) the ratio of plant and equipment to firm value, (e) the ratio of replacement value of assets to market value) (f) the ratio of depreciation expense to value) and (g) the earning price ratio.

2) **Investment-based IOS Proxy**

The investment-based IOS proxies include: the Ratio of R & D expense to firm value, Ratio of R & D expense to total assets, Ratio of R & D expense to sales, Ratio of capital addition to firm value, and the ratio of capital addition to asset book value.

3) **Variant-based IOS Proxy**

The variant-based IOS proxies (variance measurement) involve proxies revealing that an option will have higher value when the measurement variability is exploited to estimate the number of growing options, such as the variability of returns underlying the asset increase. Variant-based proxies consist of: (a) variance of total return, and (b) market model beta.
III. SAMPLE SELECTION AND DESCRIPTION

**Sample Selection**

Population in this study involve all companies listed in the Indonesia Stock Exchange in 2006-2010. While samples are selected based on the purposive sampling method. There are 182 companies as samples in this study.

**Variables**

**Investment Opportunity Set (IOS)**

According to Myers, 1977, the value of a company is the combination of asset values acquired with future investment option. In general it is stated that IOS describes the greater opportunities or investment opportunities for a company; however, it is highly dependent on the expenditure options of the company decides for the future benefit. IOS is something unobservable; hence, proxies which can be used to replace IOS are required. The proxies used in this study are those as used by Kumalahadi (2004) with 6 (six) variables:

1) The price-based IOS proxy includes:
   a. The ratio of Market to Book Asset (MTBA) =
      \[
      \frac{\text{debt book value + (total outstanding shares x share price)}}{\text{Total assets}}
      \]
   b. The ratio of Market to Book Equity (MTBE) =
      \[
      \frac{(\text{Outstanding shares x share price})}{\text{Total equity}}
      \]
   c. The ratio of stock Price to Earning per share (PER) =
      \[
      \frac{\text{Stock price}}{\text{earning per share}}
      \]

2) Investment-based IOS include:
   a. The ratio of Investment to Sales (INVOS) =
      \[
      \frac{\text{Total tangible fixed assets}}{\text{net sales}}
      \]
   b. The ratio of Investment to Earning (IOE) =
      \[
      \frac{\text{Total tangible fixed assets}}{\text{net earning}}
      \]
   c. The ratio of Capital to Total Asset (CAPXTA) =
      \[
      \frac{\text{Change in fixed assets}}{\text{total asset book value}}
      \]

**Cost of Equity Capital**

Cost of Equity Capital is the cost spent by the company that raises fund by selling common shares or using retained earnings to make investment. In this study Cost of Equity Capital of individual company sample is calculated by using the Capital Asset Pricing Model (CAPM) with the following formula:

\[
\text{COEC} = R_f + \beta (R_m - R_f) \]

\[ \text{(3.2)} \]
Where:

COEC = estimated Cost of Equity Capital,

Rf = Risk Free Rate (Rf), is the level of return obtained from investing in riskless assets. In Indonesia, Rf is computed based on the interest rate of Bank Indonesia Certificate (SBI).

Rm = Market return to be obtained by investors from investment in stocks that are reflected from the change in price index for a certain period of time.

Price index used in this study is LQ45 Stock Price Index

β = market beta, risks associated with market conditions Stock beta is calculated based on the Single Index Model formula using SPSS 17.0: Scholes-William’s method. Regression equation used to obtain stock return regression coefficient on market return is as the following (Yogiyanto, 2006):

\[ R_{it} = \alpha_i + \beta_i (R_{mt}) + \varepsilon_i \]  

where,

\[ R_{it} = \text{return on stock } i \text{th at } t \text{th} \]

\[ \alpha_i = \text{the expected value of independent securities return on market return} \]

\[ \beta_i = \text{coefficient measuring } R_i \text{ due to } R_m \text{ changes} \]

\[ R_{mt} = \text{rate of return of market index that is also a random variable} \]

\[ \varepsilon_i = \text{residual error that is a random variable with the expected value equal to zero or } E(\varepsilon_i) = 0 \text{ stock beta correction} \]

Analysis Technique

The hypothesis testing of this study is conducted by using the alpha level of 5%, using the Version 1.0 PLS program Following is the Structural Equation:

\[ \text{COEC} = \beta_{11.IOS} + \varepsilon \]

Note:

COEC = Cost Of Equity Capital

IOS = Investment Opportunity Set

\[ \varepsilon = \text{Residual on Cost of Equity Capital} \]
IV. RESULT AND DISCUSSION

Descriptive Statistics of Variables

Table 4.1 presents the results of descriptive statistical analysis of individual variable in this study.

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Average</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTBA</td>
<td>182</td>
<td>0.00</td>
<td>8.52</td>
<td>1.8170</td>
<td>1.94510</td>
</tr>
<tr>
<td>MTBE</td>
<td>182</td>
<td>0.00</td>
<td>8.92</td>
<td>1.8243</td>
<td>1.81171</td>
</tr>
<tr>
<td>INVOS</td>
<td>182</td>
<td>0.00</td>
<td>5.75</td>
<td>1.0515</td>
<td>1.22871</td>
</tr>
<tr>
<td>PE</td>
<td>182</td>
<td>1.70</td>
<td>98.30</td>
<td>22.0764</td>
<td>17.60589</td>
</tr>
<tr>
<td>IOE</td>
<td>182</td>
<td>0.03</td>
<td>39.98</td>
<td>8.0918</td>
<td>9.96406</td>
</tr>
<tr>
<td>CAPXTA</td>
<td>182</td>
<td>0.00</td>
<td>1.93</td>
<td>0.9031</td>
<td>0.26925</td>
</tr>
<tr>
<td>COEC</td>
<td>182</td>
<td>-3.19</td>
<td>3.80</td>
<td>0.2762</td>
<td>1.00119</td>
</tr>
</tbody>
</table>

Valid N (listwise)182

Based on descriptive statistics in Table 4.1, the minimum value of MTBA is 0.03; its maximum value is 4936437 with the mean of 404870.48 and the standard deviation of 837769.68. Hence, there is a wide range, from minimum to maximum value. The minimum value of MTBE is 0.00, its maximum value is 7981726 with the mean of 404870.48, and the standard deviation of 1543256.22. The INVOS minimum value is 0.00, its maximum value is 5401.64 with the mean of 97.19 and the standard deviation of 721.73. The minimum value of PE is 0.35 and its maximum is 543229.17, with the mean of 13706.06 and the standard deviation of 76374.08. The minimum value of IOE is 0.06, and its maximum value is 386.22 with the mean of 386.22 and the standard deviation of 2422.3. The minimum value of CAPXTA is 2.68, and its maximum value is 1.00, with the mean of 0.3 and the standard deviation of 0.75.

Construct Validity Test

Convergent Validity

In terms of convergent validity of the measurement model, its indicator is assessed based on the correlation between item score and construct score, which is computed by using SmartPLS. According to Chin 1998 in Ghozali 2008, a construct is stated to have good convergent validity when the loading factor indicates higher than 0.70. While the factor
loading, between 0.50 and 0.60 can still be applied for a model that is still under development. Based on these criteria, then, the indicators with the loading factor less than 0.50 are deleted. With 182 data in this study, after deleting some non-valid data, the following output path diagram is produced and it is shown in Figure 4.1:

Based on the above picture, it is indicated that all loading factors are higher than 0.50; this means that the constructs have good convergent validity.

Following is the result of the correlation output between indicator and its constructs.

### Table 4.2

**Outer Loadings (Mean, STDEV, T-Values)**

| Original Sample (O) | Sample Mean (M) | Standard Deviation (STDEV) | Standard Error (STERR) | T Statistics (|O/STERR|) |
|---------------------|-----------------|----------------------------|------------------------|--------------------------|
| COEC <- COEC        | 1.000000        | 1.000000                   | 0.000000               |                          |
| INVOS <- IOS        | 0.811610        | 0.762928                   | 0.156443               | 5.187889                 |
| IOE <- IOS          | 0.696586        | 0.662734                   | 0.212556               | 3.277196                 |
| PE <- IOS           | 0.763448        | 0.756016                   | 0.140849               | 5.420316                 |

Based on the Results for outer loadings in Table 4.1, all indicators are significant at $\alpha = 5\%$. It is shown that all indicators have statistical T-statistics (see Table-1) that is higher than T-table = 1.653 (sig at 0.05). Their loading factor is $> 0.50$, i.e. INVOS has the loading factor of 0.793168 and T-statistics of 5.778140. IOE has the loading factor of 0.614060 and T-statistics of 2.850637, and PE has the loading factor of 0.676800, and T-statistics of 7.190387; and the T-statistics is higher than T-Table (T-Table with the significance level of 5%, and DF = 182, is 1.653 ).
Hypothesis Testing

Testing on Goodness of Fit Model

Testing on structural model is evaluated by using the R-square values for the dependent constructs that is goodness-fit model with the results of the analysis of data obtained from the calculated model. R-square indicates to what extent the influence level of independent variables on the dependent variables. The result of R² are 0.67; 0.33; and 0.1, indicating that the model is “Good”, “Moderate”, and “Poor”.

The result of us testing of the structural model is as the following:

Based on Table 4-3, it is identified that the influence of IOS (INVOS, PE, IOE) to COEC provides R square value of 0.091459, (see Table 4-3) which can be interpreted that the variability of COEC construct that can be explained by the variability of IOS constructs (INVOS, PE, IOE) is 9.1459%, while 91.359% is explained by other variables other than investigated. The R2 result of 9.1459% indicates that the model has “poor” goodness of fit.

Following is the summary of hypothesis testing result in this study that as shown in the following Table 4.4

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Coefficient Value</th>
<th>T-statistics</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>INVOS</td>
<td>0.811610</td>
<td>5.187889</td>
<td>Proved</td>
</tr>
<tr>
<td>PE</td>
<td>0.763448</td>
<td>5.420316</td>
<td>Proved</td>
</tr>
<tr>
<td>IOE</td>
<td>0.696586</td>
<td>3.277196</td>
<td>Proved</td>
</tr>
</tbody>
</table>
The empirical hypothesis testing using the Structural equation 4.1, which is the result of data analysis based on SmartPls Software Version 2.0 shows the following result:

The first equation, the influence of Investment Opportunity Set on the Cost of Equity Capital is:

\[ \text{COEC} = -0.283 \text{ IOS} \] ................................. (4.1)

Based on the Structural equation 4.1, it is shown that the influence of Investment Opportunity Set on Cost of Equity Capital is indicated by the coefficient value of –0.283; this is a coefficient direction consistent with the hypothesis 1 stating that Investment Opportunity Set provides negative influence on Cost of Equity Capital.

V. CONCLUSION

Based on the analysis result on data of the study conducted through SmartPLS, the following conclusions are drawn:

1. Investment Opportunity Set (MTBA, MTBE, INVOS, PE, IOE and CAPXTA) proxies fulfilling the criteria involve INVOS, PE and IOE with the description as follows:
   a) the ratio of investment to sales (INVOS), coefficient value of 0.811610, T- statistics of 5.187889 > T-Table of 1.653
   b) the ratio of stock price to stock (PER), coefficient value of 0.763448, T-statistics of 5.420316 > T-Table of 1.653
   c) the ratio of investment on earning (IOE), coefficient value of 0.696586, T- statistics of 3.277196 > T-Table of 1.653

2. Based on path analysis, it is identified that the Investment Opportunity Set variable provides negative influence on the Cost of Equity Capital of –0.283. This indicates that the hypothesis is proved.

3. Result of R2 of 9.1459 % indicates that the model has “poor” goodness of fit.
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