THE INFLUENCE OF FIRM-SPECIFIC FACTORS TOWARDS FINANCIAL LEVERAGE OF MINING SECTOR IN INDONESIA

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A Skripsi presented to the Faculty of Business President University in partial fulfillment of the requirements for Bachelor Degree in Economics Major in Management

January 2018
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I declare that this skripsi, entitled "THE INFLUENCE OF FIRM-SPECIFIC FACTORS TOWARDS FINANCIAL LEVERAGE OF MINING SECTOR IN INDONESIA" is, to the best of my knowledge and belief, an original piece of work that has not been submitted, either in whole or in part, to another university to obtain a degree.

Cikarang, Indonesia, January 18th 2018

Jessyca Amizara
ABSTRACT

This research examines factors influencing financial leverage considering that the use of debt is very essential in financing decision. The high level of leverage employed by the mining sector yet low earnings per share generated during the observation period leads to a question, ‘What are the factors, other than earnings per share, that influence leverage decision?’ In order to answer the question, this research examines whether there are partial and simultaneous significant influence of return on assets, current ratio, firm size, and assets tangibility towards debt to equity ratio. Annual data of 10 companies in mining sector listed on Indonesia Stock Exchange (IDX) for 5-year period (2012-2016) is analyzed by using multiple regression analysis, adopting fixed effect model. Classical assumption test is conducted to make sure the data obtained will lead to valid results. The results show that return on assets and current ratio partially influence debt to assets ratio negatively and significantly. These profitability and liquidity will provide internal source of funds, so less leverage is needed. While firm size and assets tangibility have partial significant positive influence towards debt to assets ratio. Larger firms and firms with more tangible assets tend to employ more leverage. Simultaneously, those independent variables influence debt to assets ratio by 90.7521%.

Keywords: return on assets, current ratio, firm size, assets tangibility, debt to assets ratio
ACKNOWLEDGEMENT

First of all, the researcher would like to praise God for his blessings of strength, peace of mind, and health, so that the researcher could finish this research as final thesis for Bachelor Degree.

Researcher would also like to express her gratitude and appreciation to the following people which have been so helpful and supportive.

1. Researcher’s family, especially Mom and Dad, thanks for the endless love, prayers, support, and encouragement.
2. Researcher’s thesis adviser, Mr. Purwanto ST., MM., thank you for the guidance, patience, and kindness during the process of doing this research.
3. Researcher’s best lecturers, Ms. Marie Ann and Mrs. Rosita Widjojo, thank you for the support, help, and encouragement, as well as the lessons that have been taught during the past semesters in President University.
4. Lecturers of President University, thank you for the knowledge that has been shared during her study in President University.
5. Gerry Immanuel, a very kind and helpful senior as well as friend, thanks for helping the researcher with the information needed in this research.
6. Researcher’s best friends that can’t be mentioned one by one, thanks for the shared moments, joy, and laughter during her study in President University, and also for the motivation, supports, tips, and suggestions related to this thesis.
7. Lastly, to those who indirectly contribute in this research, thank you very much.

The researcher is fully aware that this thesis is far away from perfection, but hopefully this thesis can give positive contribution to the readers and provide information for the people who need it.

Best Regards,

Jessyca Amizara
TABLE OF CONTENTS

PANEL OF EXAMINERS APPROVAL SHEET .................................................. i
DECLARATION OF ORIGINALITY ............................................................ ii
ABSTRACT ................................................................................................... iii
ACKNOWLEDGEMENT .............................................................................. iv
TABLE OF CONTENTS .............................................................................. v
LIST OF TABLES ......................................................................................... viii
LIST OF FIGURES ....................................................................................... ix
LIST OF EQUATION .................................................................................... x
LIST OF ACRONYMS ................................................................................. xi

CHAPTER I  INTRODUCTION ....................................................................... 1
  1.1 Background .............................................................................................. 1
  1.2 Problem Identification ............................................................................ 5
  1.3 Research Questions .............................................................................. 6
  1.4 Research Objectives ............................................................................. 6
  1.5 Scope and Limitations .......................................................................... 7
  1.6 Research Benefit ................................................................................... 7
  1.7 Definition of Terms .............................................................................. 8
  1.8 Research Outline .................................................................................. 9

CHAPTER II  LITERATURE REVIEW .......................................................... 11
  2.1 Theoretical Review ............................................................................. 11
    2.1.1 Capital Structure Theory ............................................................... 12
    2.1.2 Leverage ....................................................................................... 13
    2.1.3 Profitability ................................................................................. 15
    2.1.4 Liquidity ...................................................................................... 16
    2.1.5 Firm Size ..................................................................................... 18
    2.1.6 Tangibility ................................................................................... 19
  2.2 Previous Research ............................................................................. 20
  2.3 Research Gap ..................................................................................... 23
CHAPTER III  METHODOLOGY .......................................................... 26

3.1 Research Method ........................................................................ 26
3.2 Research Framework .................................................................. 27
3.3 Sampling Design ......................................................................... 28
  3.3.1 Size of Population .................................................................... 29
  3.3.2 Size of Sample ........................................................................... 29
3.4 Research Instrument ...................................................................... 31
3.5 Data Collection Method ................................................................. 32
3.6 Operational Definition ................................................................. 33
3.7 Data Analysis Method ................................................................... 34
  3.7.1 Descriptive Statistic Analysis .................................................... 34
  3.7.2 Panel Data Regression ............................................................... 35
  3.7.3 Classical Assumption Test ......................................................... 40
  3.7.4 Multiple Regression Analysis .................................................... 45
3.8 Testing the Hypothesis ................................................................. 46
  3.8.1 Significant Level ....................................................................... 47
  3.8.2 T-Test ....................................................................................... 47
  3.8.3 F-Test ....................................................................................... 50
  3.8.4 Coefficient of Determination .................................................... 51

CHAPTER IV  ANALYSIS OF DATA AND INTERPRETATION OF
RESULTS .................................................................................................. 53

4.1 Company Profile ........................................................................... 53
4.2 Descriptive Analysis ...................................................................... 61
4.3 Data Analysis ................................................................................ 64
  4.3.1 Panel Data Regression ............................................................... 64
  4.3.2 Classical Assumption Test ......................................................... 65
  4.3.3 Multiple Regression Analysis .................................................... 69
4.4 Hypotheses Testing ........................................................................ 71
  4.4.1 T-test ....................................................................................... 71
  4.4.2 F-Test ....................................................................................... 73
  4.4.3 Coefficient of Determination .................................................... 74


**LIST OF TABLES**

Table 3.1. Operational Definition ................................................................. 33
Table 3.2. Interpretation of R² ........................................................................ 45
Table 4.1. Financial Highlight of PT. Adaro Energy Tbk ............................. 53
Table 4.2. Financial Highlight of PT Medco Energi Internasional Tbk ........ 54
Table 4.3. Financial Highlight of PT. Vale Indonesia ..................................... 55
Table 4.4. Financial Highlight of PT. Indo Tambangraya Megah Tbk ....... 56
Table 4.5. Financial Highlight of PT. Benakat Integra Tbk ......................... 56
Table 4.6. Financial Highlight of PT. Bayan Resources Tbk ....................... 57
Table 4.7. Financial Highlight of PT. Delta Dunia Makmur Tbk ................. 58
Table 4.8. Financial Highlight of PT. Apexindo Pratama Duta Tbk .......... 59
Table 4.9. Financial Highlight of PT. J Resources Asia Pasifik Tbk ............ 60
Table 4.10. Financial Highlight of PT. Surya Esa Perkasa Tbk ................. 60
Table 4.11. Descriptive Statistics ................................................................. 61
Table 4.12. Chow Test .................................................................................. 64
Table 4.13. Hausman Test ............................................................................ 65
Table 4.14. Normality Test Result ............................................................... 66
Table 4.15. White Test Result ..................................................................... 67
Table 4.16. Autocorrelation Test Result ....................................................... 68
Table 4.17. Multicollinearity Test Result ....................................................... 68
Table 4.18. Multiple Regression Analysis Result ....................................... 69
Table 4.19. T-Test Result ........................................................................... 72
Table 4.20. F-Test Result ........................................................................... 73
Table 4.21. Coefficient of Determination Result ....................................... 74
LIST OF FIGURES

Figure 1.1. Debt to Assets Ratio, 2012-2017…………………………………… 3
Figure 1.2. Earnings per Share, 2012-2017…………………………………… 4
Figure 2.1. Theoretical Framework……………………………………………… 24
Figure 3.1. Research Framework……………………………………………….. 27
Figure 3.2. Flow Panel Data Regression………………………………………… 40
LIST OF EQUATION

Equation 1. Debt to Assets Ratio................................................................. 15
Equation 2. Return on Assets................................................................. 16
Equation 3. Current Ratio................................................................. 17
Equation 4. Firm Size................................................................. 18
Equation 5. Assets Tangibility................................................................. 19
Equation 6. Mean................................................................. 34
Equation 7. Standard Deviation................................................................. 35
Equation 8. Chow Test................................................................. 38
Equation 9. Hausman Test................................................................. 39
Equation 10. Jarque-Bera................................................................. 42
Equation 11. Durbin Watson................................................................. 43
Equation 12. Multiple Regression Analysis................................................................. 45
Equation 13. T-Test................................................................. 48
Equation 14. F-Test................................................................. 50
Equation 15. Adjusted R²................................................................. 51
Equation 16. Multiple Regression Analysis Result................................................................. 70
Equation 17. Debt to Assets Ratio in Multiple Regression Result................................................................. 73
**LIST OF ACRONYMS**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANOVA</td>
<td>Analysis of Variance</td>
</tr>
<tr>
<td>BLUE</td>
<td>Best Linear Unbiased Estimator</td>
</tr>
<tr>
<td>DA</td>
<td>Debt to Assets Ratio</td>
</tr>
<tr>
<td>ROA</td>
<td>Return on Assets</td>
</tr>
<tr>
<td>CR</td>
<td>Current Ratio</td>
</tr>
<tr>
<td>EPS</td>
<td>Earnings Per Share</td>
</tr>
<tr>
<td>IDX</td>
<td>Indonesia Stock Exchange</td>
</tr>
<tr>
<td>OLS</td>
<td>Ordinary Least Square</td>
</tr>
</tbody>
</table>
CHAPTER I
INTRODUCTION

1.1 Background

Financial leverage is a significant aspect in financial management when it comes to any business activities that need external source of funds. Financial leverage refers to the amount of debt used by an entity to finance its assets. It also represents the total debt reported to equity of the firm, and indicates the ability of the entity to attract external source of finance. Furthermore, leverage is perceived as modality that supports the company’s growth (Srivastava, 2014). As explained by Horne & Wachowicz (2009), financial leverage is the use of fixed financing cost taken with the hope of maximizing stockholders’ return. In other words, to earn more than the financing cost paid.

The level of leverage will affect the capital structure of the firm. Capital structure is the combination of debt and equity used as external financing sources. According to Myers & Majluf (1984), in raising external funds, firm will firstly prefer debt, and then equity if the debt is not sufficient. The interest payments of debt lower the amount of profit tax that the company is liable for. Such deduction is not found in equity and thus, makes debt preferable in the term of profit taxation matter (Dwenger & Steiner, 2009). Moreover, raising equity means giving up ownership and thus, the company should contribute a portion of company’s earnings to the stockholders. While when taking debt, the lender doesn’t have any claim on company’s profit and entitled only to the repayment of agreed-upon interest and the principal of the loan. Since the company doesn’t contribute its profit to the lender, the owner could have more earnings rather than they would if they had issues stocks to the investors.
However, highly levered firms are associated with higher risk of bankruptcy because levered firms are required to repay the debt principal and interest in timely manner and use its assets as collateral of its debt (Chada & Sharma, 2015). So when the firm is unable to meet the required payment, it may lose its assets as it pledged as collateral, and be forced to bankruptcy because of not being able to do the business operation. High level of leverage might also limit the company’s ability to raise equity because investors might refuse to invest capital in over-leveraged company. Besides, the new lender might refuse the proposal of raising more debt due to the amount of existing debt, and this situation will limit the companies’ ability to operate. Therefore, leverage decision is crucial in financial management. The financial managers should know the optimum amount of leverage that will maximize the return for the stakeholders.

Singh (2016), Sheikh & Wang (2011), Ridloah (2010), and Alzomaia (2014), use debt to assets ratio to measure the level of leverage used by firms as the part of firms’ capital structure. Debt to assets ratio is one of several financial leverage ratios which represents the proportion of debt used by the company relative to the company’s total assets. In other words, this ratio tells the portion of assets being financed by debt (Horne & Wachowicz, 2009).

Considering that leverage decision is critical, a set of data of leverage ratio of each industry sector listed on IDX is analyzed. Figure 1.1 shows that mining sector has been employing high level of leverage since 2012. In the third quarter of 2017, mining sector has the highest leverage among all sectors. While infrastructure is the second highest, followed by agribusiness sector and basic industry and chemicals sector. The average debt to assets ratio of mining sector in 2017 is more than 0.4, which indicates that more than 40% of companies’ assets in this sector are financed by debt, and the rest portion of assets are financed by equity. While the other sectors use debt to finance only less than 40% of their assets in 2017.
Since high level of leverage will increase the risk of bankruptcy, mining sector is exposed to the highest risk in 2017. Higher debt ratio will decrease the solvency of the company, and thus, putting the company at risk of not being able to pay back the interest and principal of the debt. It’s a crucial issue faced by financial managers, about how to decide the amount of leverage that the company should employ to give optimum capital structure with minimum cost of capital and maximum return for stakeholders, considering also the risk of the increased leverage (Srivastava, 2015).

According to Horne & Wachowicz (2009), as financial leverage is taken with the hope of maximizing return for the stockholders, the favorability of financial leverage can be judged from the effect it has on the earnings per share (EPS) provided to the stockholder. EPS will increase up to an optimum level of leverage, and then decrease when the leverage exceeds the optimum level, which makes it unfavorable (Horne & Wachowicz, 2009).
The average EPS of each sector listed on IDX is also analyzed to see how the return for stockholders is maximized. Figure 1.2. represents the average EPS for each sector listed on IDX from the first quarter of 2012 until the third quarter of 2017.

Figure 1.2. Earnings Per Share, 2012-2017

*Source: Bloomberg, 2017*

According to Figure 1.2., most of the time, mining sector has the lowest EPS among all sectors, which even hits negative value at several point of the year. Furthermore, the debt to assets ratio doesn’t look like moving in line with the EPS which fluctuates much more than the leverage. At several points of the year the sector employs high leverage even though the EPS is very low. It indicates that the sector doesn’t always employ leverage in the optimum level that maximize EPS.
Since employing debt in high level is risky, leverage decision is critical for financial managers. The high level of leverage in mining sector and the given data that shows the sector doesn’t always employ leverage at the optimum level of EPS encourage the researcher to study about other factors that may affect leverage decisions.

### 1.2 Problem Identification

The average debt to assets ratio of mining sector which shows value of more than 0.4 in 2017 indicates that in average, more than 40% of the companies’ assets are financed by debt. That is the highest ratio among the nine sectors listed on IDX. As shown in the figure 1.1., mining sector has been employing high level of leverage for the past few years, compared with the other sectors. The high level of leverage is associated with the risk of bankruptcy (Srivastava, 2014).

According to Horne & Wachowicz (2009), the favorability of financial leverage can be judged by the effect on the EPS. Since leverage is employed with the hope of maximizing return for stockholders, the increase in EPS is expected in using financial leverage. However, the data shown on figure 1.1 and figure 1.2 shows that the EPS of mining sector for the past few year has been relatively low compared with the other sector, and even hit negative value, despite its highest leverage. It indicates that the high level of leverage employed is not really favorable since it doesn’t maximize the EPS.

Given the condition that maximizing EPS doesn’t seem to be the only consideration behind the leverage decision, it leads to a question; what other factors is considered when taking leverage decision? Leverage decision is critical for the financial managers considering the risk of employing high level of debt can affect the continuance of the business.

According to the previous studies, there are several factors that can be the determinants of leverage. Those factors are profitability, liquidity, firm size, and assets tangibility. Singh (2016) uses current ratio as the proxy of
liquidity and Dewi & Lestari (2014) uses ROA as the proxy of profitability. However, there are gap among studies which shows different results of factors affecting leverage decision. The problem stated above and the variance of the results of the studies encourage the researcher to find out what other factors are considered when making leverage decision, with sample taken from the companies in mining sector listed on IDX. The researcher will focus on the debt to assets ratio as a measure of leverage employed by the companies.

1.3 Research Questions

Based on background and problem identification above, there are several variables that the researcher will use in this study. It leads to some questions, such as:

1. Is there a significant influence of return on assets towards debt to assets ratio of mining companies listed on IDX?

2. Is there a significant influence of current ratio towards debt to assets ratio of mining companies listed on IDX?

3. Is there a significant influence of firm size towards debt to assets ratio of mining companies listed on IDX?

4. Is there a significant influence of assets tangibility towards debt to assets ratio of mining companies listed on IDX?

5. Is there a simultaneous significant influence of return on assets, current ratio, firm size, and assets tangibility towards debt to assets ratio of mining companies listed on IDX?

1.4 Research Objectives

Based on the statement of problem, the research objectives of this study can be stated as follows:
1. To determine if there’s a significant influence of return on assets towards debt to assets ratio of mining companies listed on IDX.

2. To determine if there’s a significant influence of current ratio towards debt to assets ratio of mining companies listed on IDX.

3. To determine if there’s a significant influence of firm size towards debt to assets ratio of mining companies listed on IDX.

4. To determine if there’s a significant influence of assets tangibility towards debt to assets ratio of mining companies listed on IDX.

5. To determine if there’s a significant simultaneous influence of return on assets, current ratio, firm size, and assets tangibility towards debt to assets ratio in mining companies listed on IDX.

1.5 Scope and Limitations

This study is limited to the scope of mining companies listed on IDX, by analyzing the influence of financial ratios, firm size, and growth towards leverage measured in debt to assets ratio. The financial ratio is limited to profitability, liquidity, and tangibility which is measured by ROA, current ratio, and fixed assets to total assets ratio respectively. While the period of this study is limited only in the period of 2012-2017 in annual basis.

1.6 Research Benefit

This research is conducted with the hope of being beneficial for:

1. Companies: this study can be used as reference in analyzing factors affecting leverage. Those factors, then can be consideration in leverage decision.

2. Investors: this study can be used as consideration to assess company’s capability to fulfill its obligation towards the creditors,
and therefore, can be used as consideration before investing in that company.

3. **Future researchers**: this study gives insight about leverage and enhance researchers’ knowledge about factors affecting leverage. Therefore, can serve as literature that gives additional information and findings that can support future research about determinants of leverage.

4. **University**: this study can serve as literatures and study in the field of financial leverage.

### 1.7 Definition of Terms

The terms used in this research can be defined as follows;

1. **Financial leverage**: The use of debt in capital structure (Graham & Smart, 2011).

2. **Financial management**: Acquisition, financing, and management of assets with some overall goals in mind (Horne & Wachowicz, 2009).

3. **Capital structure**: The combination of debt and equity (Chada & Sharma, 2015).

4. **Earnings per share**: The portion of company’s earnings allocated to each share of common stock (Horne & Wachowicz, 2009).

5. **Profitability**: The firm’s ability to generate earnings (Gibson, 2011)

6. **Liquidity**: the firm’s ability to regularly convert its assets into cash to pay its short term obligations (Keown, et al., 2011).
7. **Return on assets**: Ratio that measures the firm’s ability to utilize its assets to create profits (Gibson, 2009).

8. **Current ratio**: Ratio to assess the firm’s short-term debt paying ability (Gibson, 2011)

9. **Firm size**: A measurement of firm’s scale by its assets (Sitanggang, 2014)

10. **Assets tangibility**: The proportion of fixed assets relative to the total assets (Singh, 2016).

11. **Debt to assets ratio**: Ratio to measure the portion of assets financed by debt (Horne & Wachowicz, 2009).

12. **Stockholders**: The owner of one or more stocks in an incorporated business (Gibson, 2011).

### 1.8 Research Outline

The content of this research can be categorized into 5 (five) chapters which can be detailed as follows;

**CHAPTER I INTRODUCTION**

This chapter mainly describes the background of this research. Debt to assets ratio become the focus on this research because leverage decision is critical in financial management. Due to its importance the financial managers should know what factors to consider when taking leverage decision. This chapter defines the problem and details the research objectives which become the orientation of conducting the research.

**CHAPTER II LITERATURE REVIEW**

This chapter is basically the collection of theories, concepts, literatures, and previous studies which is related to this research. The previous studies help
CHAPTER III METHODOLOGY

This chapter explains about the methodology used in the research. This research is a quantitative research with purposive sampling method. The data used in this research is secondary data which is obtained from the existing source. The tools used in this research is also explained in this chapter. This chapter also provides research framework as the basis of steps in doing research.

CHAPTER IV ANALYSIS OF DATA AND INTERPRETATION OF RESULT

This chapter details the information about the data that has been processed and the interpretation of the results. This chapter mainly answers and gives explanation to the research questions and accomplishes the research objectives. The raw data is processed by using Eviews with several tests, such as descriptive statistics, classical assumption, multiple regression, and hypothesis testing. The result is then interpreted with in-depth analysis. Relevant literature studies are included in the analysis of results in this chapter.

CHAPTER V CONCLUSIONS AND RECOMMENDATION

This chapter concludes all the interpretation and analysis of chapter IV. Any recommendation related to the result of the research is also provided in this chapter.
CHAPTER II

LITERATURE REVIEW

2.1 Theoretical Review

Financial Management involves acquisition, financing, and management of assets with some overall goals in mind. It performs decision function on 3 major areas, such as investment decision, financing decision, and asset management decision. Investment decision is related to the amount of assets held by the company, which will reflect the size of the company. This include the determination of asset composition, as well as the replacement of assets that can no longer be economically justified. Financing decision is the other major decision of the firm, which deals with type of funds employed by the firm. This decision is shown at the right part of balance sheet, which is the liabilities and equities section. While asset management decision covers the responsibilities of managing the existing assets efficiently. Overall, the efficient financial management is judged by the achievement of its goal which is to maximize the wealth of the firm’s present owners, and any other possible objectives (Horne & Wachowicz, 2009).

Providing funds necessary to support assets is a major facet of financial management. There are various financing sources with different characteristic such as cost, maturity, availability, and other terms imposed by the supplier of the funds (Horne & Wachowicz, 2009). Firms raise fund from internal and external sources. Internal sources of finance are funds raised from the inside of business. It could be in the form of retained earnings or the sale of fixed assets that would free up cash. While external sources of finance are funds raised from the outside of the company, could be in the form of debt and equity. (Jana, 2010).
2.1.1 Capital Structure Theory

When raising external funds, capital structure and cost of capital becomes the concern of financial managers. Capital structure is the combination of debt, common stock, and preferred stock used by the firms for long term financing (Horne & Wachowicz, 2009).

Capital structures differ across industries. Even in a certain industry, capital structures vary among firms (Ehrhardt & Brigham, 2011). It is important for financial managers to compare the merits and demerits of various financing sources that will minimize the cost of capital and maximize firms’ market value, so that the optimum capital structure can be achieved. Equity holders are the owner of the firms who are concerned with the dividend payment taken from retained earnings, and therefore, they have long-term commitment. While the debt holders, often called as creditors, are not committed in the long term, and more concerned with the payment of interest and principal of the debt in timely manner (Chada & Sharma, 2015).

In raising capital, company must deal with the cost of capital. The cost of capital is defined as weighted average of individual rate of return. In other words, cost of capital is the required rate of return of various type of financing. Cost of capital consists of cost of equity and cost of debt. Cost of equity is the required rate of return on investment of the shareholders of the company, while cost of debt is the required rate of return on investment of the lenders of the company, often expressed in term of interest paid on the debt taken (Horne & Wachowicz, 2009).

The interest payments of debt lower the amount of profit tax that the company is liable for. Such deduction is not found in equity and thus, makes debt preferable in the term of profit taxation matter (Dwenger & Steiner, 2009). According to Trade-Off Theory, optimum capital structure is achieved by balancing out the benefit and bankruptcy-related cost to which the benefit will outweigh the cost of capital. Up to certain point, the
marginal tax shelter benefit is equal to marginal bankruptcy-related cost, and this point is the optimal capital structure. Beyond this point, the increase in debt will make the bankruptcy-related costs exceed the tax benefit. The optimum point of capital structure varies among firms, depending on its business risk (Ehrhardt & Brigham, 2011).

Myers & Nicolas Majluf (1984) explains that in Pecking Order Theory, firms have an order of preference in raising capital. Firms will firstly use internal source, commonly retained earnings to finance its assets. Then if the use of internal source doesn’t provide sufficient fund, firm will firstly prefer debt, and then equity if the debt is not sufficient (Anderloni and Tanda, 2014).

The order of preference is caused by the asymmetric information between the firms’ managers and outside investors. The firms’ managers are assumed to know more about the real condition of the firms rather than the outside investors do (Acaravci, 2015). So when the managers are having inside information that is favorable to them, they will avoid issuing equity as good investment opportunities. An equity issue will raise an assumption of the investors that the equity is overvalued, because the managers won’t be happy to sell equity if it is undervalued (Frank & Goyal, 2009). That’s why when firms are issuing new shares, it can be perceived as bad signal by the investors, and thus, may decrease the value of the old shares (Myers & Majluf, 1984).

2.1.2 Leverage

The use of debt in firms financing refers to the term leverage, in which the firms that use debt as its financing activities is called levered firms (Chada & Sharma, 2015). The term of leverage in finance is also used to describe the extent to which a firm uses fixed costs funds in operating or financing decision that influence the company’s performance. Basically, there are 3 types of leverage, such as operating leverage, financial leverage, and total
leverage (Bobinaite, 2015). Operating leverage is reflected by the firms’ fixed operating cost (Ehrhardt & Brigham, 2011). While financial leverage usually refers to the use of debt in capital structure. A company having debt on its balance sheet is called leveraged and a company that finances its activity only through equity is said to be unleveraged (Graham & Smart, 2011). Then the total leverage is the combination of operating and financial leverage (Horne & Wachowicz, 2009).

Financial leverage is the use of fixed financing cost taken with hope of maximizing stockholders’ return. In other words, to earn more than the financing cost paid. The financing cost of debt is the interest that company pays on its borrowing, usually calculated in percentage and expressed after tax rate because interest is deductible for income taxes. When the firms fail to earn more than the financing cost paid, the leverage is considered unfavorable. The favorability of financial leverage can be judge based on the effect it creates towards the EPS for the common shareholders. Employing debt will increase EPS up to an optimum point which is called the optimum level of leverage. When it exceeds the optimum point, the EPS will decrease and the leverage is considered unfavorable (Horne & Wachowicz, 2009).

Financial leverage ratios are used to measure how much financial risk that the company has taken on. Basically, financial leverage ratios can be grouped into debt ratio and coverage ratio. Debt Ratio consists of Long-Term Debt Ratio, Debt-Equity Ratio (DER), and Total Debt Ratio. While Coverage Ratio consists of Times Interest Earned Ratio and Cash Coverage Ratio. Debt ratio shows how reliant a company on debt financing, or the extent to which the company uses borrowed funds. It reveals the proportion of debt or long term debt used by the company relative to the total assets or equity. While the coverage ratios show the company’s ability to meet its debt obligations (Horne & Wachowicz, 2009).
This study analyzes the firms’ financial leverage by using Total Debt Ratio, or commonly termed as Debt to Assets Ratio (DA) or Debt to Total Assets Ratio. This ratio refers to broader definition of liabilities as it includes both long-term and short-term liabilities (Psillaki and Daskalakis, 2008). This ratio represents the percentage of assets financed by creditor, and help determine the protection of the creditors in the case of insolvency (Gibson, 2011). Debt to Assets Ratio is written in the formula below:

\[
DA = \frac{Total\ Liabilities}{Total\ Assets}
\]

(Eq. 1)

This ratio shows the portion of assets being financed by debt. Generally, creditors would like this ratio to be low because lower ratio means higher level of the firm’s financing being provided by shareholders, and the larger the creditor margin of protection when there is outright loses or shrinking asset values. In other words, the lower the debt to total assets ratio, the lower the financial risk, and vice versa (Horne & Wachowicz, 2009). According to Singh (2016) and Dewi & Lestari (2014), leverage can be influenced by several factors such as profitability, liquidity, firm size, and assets tangibility. Those factors are categorized as firm-specific factors (Chipeta & Deressa, 2016; Cekrezi, 2013).

2.1.3 Profitability

Profitability is the firm’s ability to generate earnings. Analysis of profit is crucial for the management, as profit is used to measure performance. It is also a vital concern to stockholders because it derives dividends and will lead to capital gain because the increased profit can lead to increased market price. To creditors, profit is important in term of debt coverage (Gibson, 2011).

Profitability ratios are ratios that relate profits to sales and investments, which shows the overall effectiveness of a firm’s operation (Horne &
Lower profitability indicates inefficiency of the firm’s management performance. Low profitability will lead to inverse effect of market reaction and decline in assessment of company’s performance (Hilmi & Ali, 2008).

Dewi & Lestari (2014) and Alzomaia (2014) use return on assets as the proxy of profitability. Return on assets is one of profitability ratios that compares profits with the assets that generate the profits. This ratio describes the firm’s ability to utilize its assets to create profits (Gibson, 2009). Higher return on assets is preferable since it reflects the effectiveness of firms in utilizing its assets. Return on assets can be formulated as follows (Horne & Wachowicz, 2009).

\[
\text{Return on Assets} = \frac{\text{Net Profit after Taxes}}{\text{Total Assets}}
\]

(Eq. 2)

According to trade-off theory, positive relationship exists between profitability and leverage. Firms with higher profitability will employ more leverage to shield income from taxes (Singh, 2016). Furthermore, firms with higher profitability are less prone to the bankruptcy risk and this will attract more creditors to fund these firms. However, according to pecking order theory, firms will prefer internal financing rather than external financing. With higher profitability, they need less external financing, and therefore, results in lower leverage. In other words, they prefer financing the investments by using retained earnings rather than using debt (Alipour, et al., 2015).

2.1.4 Liquidity

The liquidity of an asset reflects how quick the asset can be converted into cash without losing its value. Then the liquidity of the firm as a whole can be described as the firm’s ability to regularly convert its assets into cash to
pay its short term obligations (Keown, et al., 2011). Liquidity refers to the company’s ability to pay its bills in timely manner. It compares the short term obligations with short-term resources available to meet the obligations. Greater liquidity contributes to better overall financial condition. Liquidity ratios give insight of how solvent the firm’s cash is and the ability of the firm to maintain its solvency in the case of adversity (Horne & Wachowicz, 2009).

Current ratio is one of several liquidity ratios, commonly used to assess the firm’s short-term debt paying ability. Among all the liquidity ratios, current ratio is given the highest significant rating that is most likely to appear in loan agreements, and most likely to be included in corporate objectives by the corporate controllers. Current ratio can be formulated as follows (Gibson, 2011).

\[
\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}
\]

(Eq. 3)

Higher current ratio indicates higher liquidity, which means the firm has more ability to meet its short term obligation. However, higher current ratio might also mean the inefficiency in managing receivables and inventories. Therefore, the analysis of current ratio must also consider account receivable and inventory ratio (Gibson, 2011).

According to trade-off theory, positive relationship exists between liquidity and leverage because firm with higher liquidity will be able to meet its contractual obligation in timely manner, and therefore, will employ more leverage (Sheikh & Wang, 2011). However, pecking order theory suggests liquidity and leverage have negative relationship because the accumulated cash and other liquid assets can serve as internal financing and firms prefer internal financing rather than using debt as a form of external financing (Malinic et al., 2013).
2.1.5 Firm Size

Firm size can be measured in various ways. Total assets, sales, and market capitalization are the most popular measurement of firm size in empirical corporate finance research. Total assets represent the total resources of the firm, market capitalization reflects the firm’s growth opportunities and equity market condition, while sales describe the product market competition (Dang & Li, 2015).

Size of the firm can be measured by total assets, in which the greater the total assets, the greater the size of the firm, and vice versa (Zulkarnaini, 2007). The study of Dang & Li (2015) shows that total assets is a significant proxy used in studies related to capital structure. Besides, total assets is the most common proxy used in measuring firm size, as included in the research of Singh (2016), Pattweekongka and Napompech (2014), and Ridloah (2010). Firm size is calculated by using natural logarithm of total assets, which can be formulated as follows (Khariry and Yusniar, 2016).

\[
\text{Firm Size} = \ln (\text{Total Assets})
\]

(Eq. 4)

From a financial distress perspective, larger firms are more diversified, and therefore, have less risk of bankruptcy (Warner, 1977). Moreover, larger firms may incur lower transaction cost associated with debt, and have better quality of financial information which results in lower information cost. This suggests positive relationship between size and leverage (Psillaki & Daskalakis, 2009).

However, according to pecking order theory, negative relationship between firm size and leverage may exist because large firms have less information asymmetry, so large firms have access of equity financing through share issuance, and therefore, are less leveraged (Sheikh & Wang, 2008).
2.1.6 Tangibility

Tangible assets refer to various fixed assets, such as plants, land, machinery, and vehicles (Singh, 2016). In International Accounting Standards Board (IASB) term, tangible fixed assets refer to property, plant, and equipment. International Accounting Standard (IAS) 16 distinguishes fixed assets from inventory, considering that inventory is to be sold to customers, while fixed assets such as property, plant, and equipment are held for production and is to be used for more than one period (Alexander & Nobes, 2010).

Singh (2016), Sheikh & Wang (2011), Pattweekongka & Napompech (2014), Ridloah (2010), and Alzomaia (2014) calculated assets tangibility by using fixed assets ratio, which is fixed assets divided by total assets. When measuring tangibility of assets, gross amount of fixed assets is better used as the numerator rather than depreciated fixed assets due to the fact that firms may employ different depreciation methods. It will lead to unevenness of data if depreciated fixed assets is used. Another reason to use gross fixed assets is that a firm can still pledge an asset having market value even if it’s already fully depreciated. In some cases, calculating tangibility by using gross fixed assets value will result in ratio above one, suggesting that gross fixed assets are more than total assets (Shah & Hijazi, 2004). Therefore, fixed assets ratio as proxy of asset tangibility can be calculated as follows:

\[\text{Tangibility} = \frac{\text{Gross Fixed Assets}}{\text{Total Assets}}\]  
(Eq. 5)

Assets tangibility affects the capital structure of a company and its value in case of bankruptcy (Singh, 2016). Tangibility is a good indicator to measure leverage because the more tangible assets the firm has the more the ability of the firm to acquire debt. As fixed assets can be used as collateral, it provides security to the creditor which makes firms with large amount of
fixed assets have more chance to borrow at relatively lower rate of interest. Due to this advantage of lower cost of borrowing, firms with higher tangibility is expected to borrow more than firms with less tangible assets which leads to higher cost of borrowing (Shah & Hijazi, 2004).

However, according to the theory of pecking order, firms with less tangible assets are more sensitive to informational asymmetries, and therefore, will prefer debt financing rather than equity financing (Singh, 2016). The tendency of managers to consume more than the optimal level of perquisites may result in negative relationship between collateralized capital and leverage levels (Titman & Wessels, 1988). Higher debt level will limit the manager’s consumption of perquisites due to the threat of bankruptcy and the monitor of the creditors. For firms with less collateral assets, the costs associated with this agency relation may be higher because it can be more difficult to monitor the capital outlays of such firms. For this reason, firms with less collateral assets may prefer higher leverage in order to limit their managers’ consumption of perquisites (Grossman & Hart, 1982).

2.2 Previous Research

The findings of some related researches that have been conducted become the basis of determining influential variables used in this research. Below is the summary of previous researches that have been summarized from published journals which has debt to total assets ratio as the dependent variable.

1. Singh (2016) conducted a research entitled “A Panel Data Analysis of Capital Structure Determinants: An Empirical Study of Non-Financial Firms in Oman”, analyzing the effect of return on total asset, tangibility, firm size, current ratio, growth, and non-debt tax shield towards debt to total assets ratio. The research included a sample of 61 companies listed on the Muscat Securities Market for the period of 2011-2015. The analysis was performed using panel
data techniques. The result showed that return on total assets and current ratio had negative significant effect towards debt to assets ratio, while size and growth had positive significant effect towards debt to assets ratio. The other variables, tangibility and non-debt tax shield were found to be insignificant.

2. Sheikh & Wang (2011) conducted a research entitled “Determinants of Capital Structure: An Empirical Study of Firms in Manufacturing Industry of Pakistan”, analyzing the influence of return on total assets, size, non-debt tax shield, tangibility, growth opportunities, earnings volatility, and current ratio towards debt to total assets ratio. The sample was 160 firms listed on Karachi Stock Exchange, during 2003-2007. The result showed that current ratio, profitability, tangibility, and earnings volatility affected debt to assets ratio negatively and significantly, while firm size has positive significant influence on debt to assets ratio. The other ratio, non-debt tax shield, were found to be insignificant.

3. A research conducted by Pattweekongka and Napompech (2014) entitled “Determinants of Capital Structure: Evidence from Thai Lodging Companies” analyzed the influence of several variables such as ROI, current ratio, firm size, business risk, growth opportunities, tangibility, and tax shield towards debt to assets ratio. The research included 140 hotels in Thailand for 5-year observation period, from 2006-2010. Multiple linear regression was utilized, and the result showed that ROI and current ratio had negative significant influence on debt to assets ratio, while tangibility had positive significant relationship towards debt to assets ratio. The other variables such as size, business risk, tax shield, and growth opportunities were insignificant at 5% confident level.

4. Dewi & Lestari (2014) conducted a research entitled “Faktor-Faktor Penentu Struktur Modal Perusahaan Non-Keuangan yang
Terdaftar di Bursa Efek Indonesia” analyzing the influence of firm size, growth, ROA, asset tangibility, and business risk towards debt to assets ratio. 164 nonfinancial companies were included as sample of the research. The data for the period of 2009-2013 was then analyzed by using linear regression analysis. The result showed that firm size and growth had positive significant relationship with debt to assets ratio, while ROA and assets tangibility had negative significant relationship with debt to assets ratio. The other variable, business risk, were found to be insignificant.

5. Ridloah (2010) conducted a research entitled “Faktor Penentu Struktur Modal: Studi Empirik pada Perusahaan Multifinansial”, analyzing the effect of firm size, asset tangibility, degree of operating leverage (DOL), net profit margin (NPM), current ratio, and sales growth towards debt to asset ratio. The sample was 25 multi finance companies listed on IDX, with 3-year period of observation (2005-2007). The result of regression analysis showed that only 3 independent variables that had significant influence on debt to assets ratio. Those 3 were NPM, current ratio, and firm size. NPM was found to be positively correlated with debt to assets ratio, while current ratio and firm size was found to be negatively correlated with debt to assets ratio.

6. Alzomaia (2014) conducted a research entitled “Capital Structure Determinants of Publicly Listed Companies in Saudi Arabia”, analyzing the influence of firm size, growth, assets tangibility, ROA, and risk towards debt to assets ratio. It included 93 Saudi listed companies with observation period from 2000-2010. Cross-sectional pool data methodology was employed to generate result that will explain the correlation of independent and dependent variables. The result showed that firm size and growth had positive
significant relationship. While tangibility, ROA, and risk had negative significant influence on debt to assets ratio.

7. Qian, et al. (2009) conducted a research entitled “An Empirical Investigation into the Capital Structure Determinants of Publicly Listed Chinese Companies: A Static Analysis”, analyzing the effect of return on total asset, firm size, tangibility, non-debt tax shield, and growth opportunities towards debt to assets ratio. The sample included 650 firms with observation period from 1999 until 2004. The data used in balanced panel model was obtained from China Stock Market and Accounting Research Database (CSMAR). The result of this research showed that non-debt tax shield, return on total assets, and growth opportunities were found to be positively and significantly correlated with debt to assets ratio. While size and tangibility were found to be negatively and significantly correlated with debt to assets ratio.

2.3 Research Gap

Basically, each previous research employed different independent variables. The researcher has compiled some variables from the previous research, such as return on assets, current ratio, firm size, and assets tangibility. Ridloah (2010) in the study of leverage determinants revealed that firm size had negative significant influence towards debt to assets ratio, while tangibility was found to be insignificant. However, Sheikh & Wang (2011), Dewi & Lestari (2014), and Alzomaia (2014) found that firm size was positively and significantly affected the dependent variable, debt to assets ratio. While tangibility was found to be negatively significant. In contrary, a research conducted by Pattweekongka & Napompech (2014) revealed that tangibility had positive and significant relationship with debt to assets ratio, while firm size was found to be insignificant. Then a research by Qian, et al. (2009) revealed that firm size and tangibility both had negative and significant relationship towards debt to assets ratio.
The sample of each research also differs across countries with various time period of observation. The difference in variables used, observation period, sample, and findings creates gap among researches. Therefore, this research aims to fill the gap among studies of the factors that affect financial leverage decision.

### 2.4 Theoretical Framework

Theoretical framework is a conceptual model representing beliefs of how variables that have been identified to be important to the problem, are related to each other (Sekaran & Bougie, 2011). The theoretical framework of this research is shown in figure 2.1.

![Figure 2.1. Theoretical Framework](Adjusted by researcher, 2017)

This research involves 2 types of variables, such as dependent variable and independent variable. The dependent variable of this research is financial leverage measured by debt to assets ratio. While the dependent variables include profitability which is measured by return on asset (ROA), liquidity which is measured by current ratio, firm size measured by total assets, and tangibility measured by total gross fixed assets to total asset.
2.1 Hypotheses

Based on the theoretical framework, the hypothesis of this research can be written as follows;

Hypothesis 1: There is significant influence of return on assets towards debt to assets ratio in mining sector.

Hypothesis 2: There is significant influence of current ratio towards debt to assets ratio in mining sector.

Hypothesis 3: There is significant influence of firm size towards debt to assets ratio in mining sector.

Hypothesis 4: There is significant influence of assets tangibility towards debt to assets ratio in mining sector.

Hypothesis 5: There is significant simultaneous influence of return on assets, current ratio, firm size, and assets tangibility towards debt to assets ratio in mining sector.
CHAPTER III

METHODOLOGY

3.1 Research Method

There are two approaches in conducting scientific research, such as quantitative approach and qualitative approach. Quantitative approach is one in which the researcher primarily develops knowledge by employing strategies of inquiry such as experiments and surveys, as well as collecting data on predetermined instruments that yield statistical data. While qualitative approach is one in which the researcher mainly makes knowledge claims based on the multiple meanings of individual experiences, socially and historically constructed meanings, with an intent of developing a theory or pattern. (Creswell, 2003).

Quantitative and qualitative research differ in term of general framework, analytical objectives, question format, data format, and flexibility in study design. In term of general framework, quantitative research seeks to confirm hypotheses about phenomena, while qualitative research seeks to explore the phenomena. Quantitative approach employs highly structured methods such as questionnaires, surveys, and structured observation, while qualitative approach employs semi-structured methods such as in-depth interviews, focus groups, and participant observation. In term of analytical objectives, quantitative approach seeks to quantify variations and predict causal relationship, while qualitative approach seeks to describe variation as well as describe and explain relationship. The question format of quantitative approach is close-ended, while qualitative approach has open-ended question format. Quantitative approach uses numerical data format and statistical assumptions study design. In contrary, qualitative approach uses textual data format and iterative study design (Mack, et al., 2005).
This research is conducted by using quantitative approach to analyze factors that affect leverage decision in mining industry. Quantitative research is adopted for this study because this study will focus on calculation of numerical data to generate results and conclusion. This research covers measuring variables and testing hypotheses to find out the effect of independent variables towards dependent variables. The result of this research is an objective result because the data are processed in the form of number and statistics.

3.2 Research Framework

Figure 3.1. Research Framework

Source: Adjusted by researcher, 2017

Figure 3.1. represents the process flow of this research. It is started by identifying problems based on the phenomena taken by the researcher. Then, research question and objectives are derived based on the problems.
To develop hypothesis, the researcher firstly collects and reviews literatures that provide knowledge and theories related to the problems. By reviewing literatures, the researcher finds out the independent variables that can be used in the research, and then develop theoretical framework. Theoretical framework is the fundamental in which the research is based, which describes the relationship among variables (Sekaran & Bougie, 2011).

Then, the researcher chooses the most suitable method for the research, which is quantitative method. After the method is chosen, the researcher starts collecting data from various sources, such as the financial statement of each firm which are obtained from the official website of each firm. The data gathered are inputted to Microsoft Excel 2016, to be processed further by using Eviews version 9 to get the result. The result is then analyzed and interpreted based on literature reviews, to develop conclusion of the research. The conclusion will summarize important point of the research and answer the research questions. There will also be recommendations for related parties.

3.3 Sampling Design

Sampling is the process of choosing an adequate number of elements from the population, that would make it possible for us to get general characteristics of the population elements through a study of the sample and an understanding of its properties or characteristics. Rather than collecting data from the entire population consisting of several hundreds and even thousands of elements, a sample is used in research because it would be practically expensive in terms of time, cost, and other resources to collect data from, or examine every element of population (Sekaran & Bougie, 2011).

According to Kothari (2004), there are several characteristics of a good sample design, such as:

1. Results in a truly representative sample.
2. Results in a small sampling error.
3. Viable in the context of funds available for the research study.
4. Systematic bias can be controlled in a better way.
5. The results of the sample study can be applied, in general, for the universe with a reasonable level of confidence.

3.3.1 Size of Population

Population refers to the entire group of objects of interest that the researcher wishes to examine, with every single member of population is called an element of population (Sekaran & Bougie, 2011). The population of this research is mining firms listed on Indonesia Stock Exchange (IDX). In 2017 period, there are 47 firms categorized as mining sector.

3.3.2 Size of Sample

A sample is a subgroup of population which consists of some elements selected from population. Every member of the sample is called a subject. There are two major types of sampling design. They are probability sampling and nonprobability sampling. Probability sampling is used when the elements have probabilities attached to them to be selected as sample subject, while in nonprobability sampling, the elements of population do not have the probabilities attached to be selected as sample subject (Sekaran & Bougie, 2011).

Nonprobability sampling consists of convenience sampling and purposive sampling. Convenience sampling is one when the members of the population are conveniently available to provide information to be collected. While purposive sampling refers to obtaining information from specific target groups. The purposive sampling comprises judgement sampling and quota sampling. Judgement sampling refers to selecting the subject which is perceived to be in the best position to give the information needed. While quota sampling refers to the assignment of quota for every
group, therefore it ensures that certain group are represented in the study (Sekaran & Bougie, 2011).

This research uses nonprobability sampling since the subject do not have predetermined chance to be selected as sample. Then, purposive sampling is employed in this research since only specific types of sample provide the required information. More specifically, judgement sampling is employed in this research.

The researcher uses some criteria in determining sample used in this study. Those criteria can be detailed as follows.

1. Firms are listed on Indonesia Stock Exchange.
2. Firms published their annual report regularly on Indonesia Stock Exchange during the observation period (2012-2016).
3. Firms’ stocks are not suspended from Indonesia Stock Exchange.
4. Firms do not have negative equity during the observation period (2012-2016).
5. Firms have total assets of more than 500 million USD in 2016.
6. Firms are not state-owned.

Based on those criteria, there are 10 out of 47 companies in mining sector are selected as sample for this research. The firms that are selected for this study are:

1. PT. Adaro Energy Tbk. (ADRO)
2. PT. Medco Energi International Tbk. (MEDC)
3. PT. Vale Indonesia Tbk. (INCO)
4. PT. Indo Tambangraya Megah Tbk. (ITMG)
5. PT. Benakat Intega Tbk. (BIPI)
6. PT. Bayan Resources Tbk. (BYAN)
7. PT. Delta Dunia Makmur Tbk. (DOID)
8. PT. Apexindo Pratama Duta Tbk (APEX)
9. PT. J Resources Asia Pasifik Tbk. (PSAB)
10. PT. Surya Esa Perkasa Tbk. (ESSA)

According to Roscoe (1975) in Sekaran & Bougie (2011), data which is larger than 30 and less than 500 are adequate for most research. Furthermore, in employing multiple regression analysis, the number of observation should be ten times or more as large as the total variables used in the research. In total, this research uses 5 variables which means the observation data should be 50 (5 multiplied by 10) or more. Balanced panel data is adopted in this research, consisting 5-year annual data (2012-2016) as the element of time series and 10 companies as cross sectional data. 5-year period of observation is chosen due to the limited data available on IDX. Therefore, this research uses 50 data of observation and complies with the rule because the data is larger than 30, less than 500, and equals to ten times of total variables used in this research.

3.4 Research Instrument

Since the data used in this research is obtained from available sources such as journals, books, and websites, this research only employs tools for analysis. The main tool used for analysis in this research is Eviews version 9, which is a statistical tool. This tool helps in making scientific and reliable research by providing advanced data analysis, regression, and forecasting feature (Schwert, 2010). In this research, the raw data is processed by using Eviews, through several test such as normality, heteroscedasticity, autocorrelation, and multiple regression, from which the result is interpreted and analyzed to draw conclusion.

The other tools used in this research is Microsoft Excel 2016, Microsoft Word 2016, Microsoft Visio 2016, and Adobe Reader XI. Microsoft Excel 2016 is used to collecting and processing the raw data to be ready to be inputted to Eviews. Charts and tables are also created in Microsoft Excel. Microsoft Word 2016 is a tool in composing the paper of this research,
supported by Microsoft Visio 2016 in creating drawings or figures. While Adobe Reader XI is used to review the related literatures in PDF format.

### 3.5 Data Collection Method

Based on the source of data, data can be classified into primary and secondary data. Primary data is data obtained firsthand and directly by the researcher from the variables of interest based on the specific purpose of the study. While secondary data is data gathered from sources that already existed, such as journals, books, and websites (Sekaran & Bougie, 2011).

This research uses secondary data since the data is obtained from existing resources that provide necessary information for this research. Data collected for this research is annual data from 2012-2016, obtained from financial report available on IDX and official websites of companies in mining sector. After collecting data, data was filtered to select sample based on the sampling criteria. Therefore, this research uses documentary method since the researcher tries to study a phenomenon through the analysis of documents consisting necessary information.
### 3.6 Operational Definition

**Table 3.1. Operational Definition**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Operational Definition</th>
<th>Formula</th>
<th>Measuring Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent Variable</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debt to Assets (DA)</td>
<td>Total debt divided by total assets</td>
<td>(\frac{\text{Total Debt}}{\text{Total Assets}})</td>
<td>Ratio</td>
</tr>
<tr>
<td><strong>Independent Variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return on Assets (ROA)</td>
<td>Net profit after taxes divided by total assets</td>
<td>(\frac{\text{Net Income}}{\text{Total Assets}})</td>
<td>Ratio</td>
</tr>
<tr>
<td>Current Ratio (CR)</td>
<td>Total current assets divided by total current liabilities</td>
<td>(\frac{\text{Current assets}}{\text{Current liabilities}})</td>
<td>Ratio</td>
</tr>
<tr>
<td>Firm Size (SIZE)</td>
<td>Natural logarithm of total assets</td>
<td>(\text{Ln(Total Assets)})</td>
<td>Ratio</td>
</tr>
<tr>
<td>Fixed Assets Ratio (FAR)</td>
<td>Gross fixed assets divided by total assets</td>
<td>(\frac{\text{Gross Fixed Assets}}{\text{Total Assets}})</td>
<td>Ratio</td>
</tr>
</tbody>
</table>

3.7 Data Analysis Method

3.7.1 Descriptive Statistic Analysis

Descriptive statistics refer to the transformation of data into a form that will provide information to describe variables. Descriptive statistics are measured by frequencies, central tendency, and dispersion.

Frequencies simply refer to the number of times of the occurrence of a certain phenomenon, which allow the calculation of the percentage and the cumulative percentage of the occurrence (Sekaran & Bougie, 2011).

In measuring central tendency, mean, median, and mode are used. Mean, also refer to average, is the measure that gives general information of data without unnecessarily inundating one with each of the observations in a set of data. Median is the central item in a group of observation when the data are being arrayed in descending or ascending order. Mode refer to the data that has highest occurrence, or in other words, the most frequently occurring phenomenon.

According to Schwert (2010), mean is obtained by summing up the data and dividing by the number of observation. Therefore, mean can be calculated as follows:

\[
\bar{y} = \frac{\sum_{i=1}^{N} y_i}{N}
\]

(Eq. 6)

Where:

\(N\) = Number of observation of current sample

In measuring dispersion, there are three measurement related with the mean, such as range, variance, and standard deviation. Range implies on the extreme values of data set (Sekaran & Bougie, 2011). It can be expressed as
the maximum and minimum values of the data sample (Schwert, 2010). Variance is a measure of dispersion which is calculated by subtracting the mean from each of the observations in the data set, taking the square of the difference, and then the total of these is divided by the number of observations. While standard deviation is simply the square root of variance. It is a very commonly used measure of dispersion which gives an index of a distribution spread or the data variability (Sekaran & Bougie, 2011). The smaller standard deviation indicates smaller ranges between the highest and lowest score to the average score. Standard deviation can be formulated as follows (Schwert, 2010);

$$s = \sqrt{\frac{\sum_{i=1}^{N} (Y_i - \bar{y})^2}{N - 1}}$$

(Eq. 7)

Where:

\(N\) = Number of observation of current sample

\(\bar{y}\) = Mean of the series

3.7.2 **Panel Data Regression**

There are three types of data available for empirical analysis, namely time series, cross section, and pooled data. Time series refers to observation in which the data collected in different time at regular time interval, while cross section refers to observation in which the data of one or more variables are collected at a same point of time. The combination of both time series and cross section data is called pooled data, which is also known as panel data. This research uses panel data, which gives several advantages over time series and cross section data, such as (Gujarati, 2004);

1. Panel data estimation explicitly takes into account the heterogeneity by allowing individual-specific variables.
2. More informative data, more variability, less collinearity among variables, and more degree of freedom as well as more efficiency are provided by panel data since it combines time series and cross-section observations.

3. Panel data are more suitable to study the dynamics of change as it studies the repeated cross section of observation.

4. Panel data can detect effects that can’t be measured in pure cross-section or pure time-series data.

5. Panel data enables further study of more complicated models.

6. Bias that might result from aggregating individuals into broad aggregates can be minimized by using panel data because of the availability of data for several thousand units.

Panel data can be classified into balanced panel and unbalanced panel. When the number of each cross sectional unit is the same with each time series unit, the panel data is said to be a balanced panel. However, if each panel member has different number of observation, the panel data is said to be unbalanced panel. As each sample in this research has 5 observations, balanced panel data is used in this research.

In estimating regression model using panel data, there are three basic approach that can be used (Gujarati, 2004).

1. **Common Effects (Pooled Least Square)**

This approach is the simplest one among the three because this approach ignores the space and time dimensions of the panel data, and uses only Ordinary Least Square (OLS) regression. As common effect assumes the nature of data is constant over specific time period, it often leads to constant intercept and slope. It only combines time series and cross sectional data without considering the differences over time and individuals. It leads to a distortion of the true depiction of relationship among variables, and
therefore, common effect is rarely used as model estimation (Gujarati, 2004).

2. Fixed Effects

Fixed Effect model let the intercept vary for each company. However, the slope coefficients are assumed to be constant across companies. Since fixed effect model uses dummy variable, this model is also known as Least Square Dummy Variable (LSDV) model. Even though the firms’ individuality is taken into account and the intercept varies across individuals, the intercept does not vary over time; which clearly explains where the term “fixed effects” comes from (Gujarati, 2004).

3. Random Effects

If we have several cross sectional units, fixed effect model may be expensive in terms of degrees of freedom. Then the ignorance of dummy variables about the true model can be expressed through the disturbance variable to overcome the problem. This method is called Error Components Model or Random Effects Model (Gujarati, 2004). This model uses estimation of interconnected disturbance variables across individuals and time (Widarjono, 2009). Random effects model adopts Generalized Least Squares (GLS) with assumption than intercept differs in time series and cross sectional unit (Baltagi, 2008).

The main difference of fixed effects model and random effects model is in its intercept. Fixed intercept for each cross sectional unit is found in fixed effect model, while random effects model results in intercept which represents the mean value of all cross sectional intercept, as well as error component from which random deviation of individual intercept from this mean value can be reflected (Gujarati, 2004).
There are two type of tests that can be used to determine what model is appropriate to be used in certain research. Those tests are Chow test and Hausman test (Guajarati, 2004).

1. **Chow Test (Likelihood Ratio)**

Chow test is often called F-statistics test. It is used to determine either common or fixed effect that is best used in the research. In Chow test, F-statistics compares the sum of squares of estimation error by using common effect and fixed effect (Baltagi, 2008).

When time series data is involved in regression model, there’s a possibility of structural change in the relationship between the regressand and regressors. The cause of structural change could be the differences of the intercept or the slope coefficient or both. Therefore, Chow test is used to determine whether or not structural change exist (Guajarati, 2004).

According to Baltagi (2008), Chow test can be formulated as follows;

\[
F_{N-1,NT-N-K} = \frac{(RRSS - URSS)/(N - 1)}{URSS/(NT - N - K)}
\]

(Eq. 8)

Where:

- **RSS** = Restricted Residual Sum Square (Sum of Square Residual from panel data estimation of common effect)
- **URSS** = Unrestricted Residual Sum Square (Sum of Square Residual from panel data estimation of fixed effect)
- **N** = Total cross sectional data
- **T** = Total time series data
- **K** = Independent variables
Under null hypothesis of Chow test, dummy variables have insignificant effect toward the dependent variable. Therefore, common effect should be used. However, the alternate hypothesis states that dummy variables are significantly correlated with the dependent variables, and therefore, fixed effect should be used (Baltagi, 2008). Since this research uses 5% confidence level, the result of Chow test can be explained as follows;

a. Probability value > 0.05, null hypothesis ($H_0$) is accepted and alternate hypothesis ($H_a$) is rejected. Therefore, common effect model is accepted.

b. Probability value < 0.05, null hypothesis ($H_0$) is rejected and alternate hypothesis ($H_a$) is accepted. Therefore, fixed effect model is accepted.

2. Hausman Test

Hausman Test is employed to determine whether fixed effect or random effects that is best used in the research. Hausman test has asymptotic $X^2$ distribution and can be formulated as follows (Gujarati, 2004);

\[
\text{Hausman Test} = \frac{(\beta_{FE} - \beta_{RE})^2}{\text{Var}(\beta_{FE}) - \text{Var}(\beta_{RE})}
\]

(Eq. 9)

Where:

$\beta_{FE} - \beta_{RE}$ = Coefficient of variables in fixed effects and random effects

$\text{Var}(\beta)$ = Variance

The null hypothesis of Hausman test states that cross sectional residual has no correlation with each independent variable. Therefore, random effect should be used. The alternative hypothesis states that cross sectional residual is correlated with one or more independent variable, and therefore,
fixed effect should be used (Winarno, 2011). Since this research uses 5% significance level, the result of Hausman test can be interpreted as follows:

a. Probability value > 0.05, null hypothesis (H_0) is accepted and alternate hypothesis (H_a) is rejected. Therefore, random effect model is accepted.

b. Probability value < 0.05, null hypothesis (H_0) is rejected and alternate hypothesis (H_a) is accepted. Therefore, fixed effect model is accepted.

Therefore, the steps of determining which model is most suitable for the research can be illustrated as follows;

![Figure 3.2. Flow of Panel Data Regression](Source: Syahrial, 2008)

### 3.7.3 Classical Assumption Test

Precise and efficient result can be provided by panel data if it meets the Best Linear Unbiased Estimator (BLUE) parameter. Several requirements of BLUE parameter can be detailed as follows (Gujarati, 2004):

1. \( E(u_t) = 0 \); zero mean value of \( u_t \)
2. Homocedasticity
3. No serial correlation
4. \( \text{cov}(u_i, x_t) = 0 \); zero covariance between \( u_i \) and each independent variable.

5. Has normal distribution

6. The model is correctly specified

7. No exact linear relationship between independent variables.

Classical assumption test is employed to test whether the model has fulfilled the BLUE parameter. Classical assumption consists of several tests such as normality test, heteroscedasticity test, autocorrelation test, and multicollinearity test.

1. Normality Test

Normality test is needed to check whether the data of independent and dependent variables are normally distributed (Sugiyono, 2010). The data processed in regression model should be normally distributed because regression analysis assume that residuals follow normal distribution (Erlina, 2007).

There are three things to consider in normality test. They are histogram of residuals, normal probability plot, and Jarque-Bera test of normality. A histogram is a graphic that represents the shape of probability density function of a random variable (Gujarati, 2004). If the residuals are normally distributed, the histogram will be bell-shaped. However, interpreting normality from histogram is more difficult than using coefficient of Jarque-Bera and its probability as measurement of normality (Winarno, 2011). Normal probability plot is also a graphic that shows the shape of probability density function, in which the values of variable of interest are plotted on normal probability paper, showing how close the values to form a straight line. The other measure of normality test is using Jarque-Bera. Jarque-Bera test of normality refer to asymptotic, large-sample test based on ordinary least square residuals (Gujarati, 2004). In this test, the difference between the skewness and kurtosis of the series and those of the normal distribution...
is measured (Schwert, 2010). According to Gujarati (2004), Jarque-Bera can be computed as follows;

\[
Jarque - Bera = n \left[ \frac{S^2}{6} + \frac{(K - 3)^2}{24} \right]
\]

(Eq. 10)

Where:

- \( n \) = Number of observation
- \( S \) = Skewness
- \( K \) = Kurtosis

Jarque-Bera value should be compared with \( X^2 \) table with 2 degrees of freedom to determine whether the residuals are normally distributed or not. Under the null hypothesis, which the value of statistic is close to zero, residuals are normally distributed. However, if the value of statistic is very different from 0, the residuals are not normally distributed (Gujarati, 2004). Since this study use 5% significant level, the Jarque-Bera value is compared with \( X^2 \) table with 2 degrees of freedom under 0.05 significant level. Therefore, the Jarque-Bera value can be interpreted as follows;

a. Jarque-Bera > value of \( X^2 \) table; the residuals are not normally distributed.

b. Jarque-Bera < value of \( X^2 \) table; the residuals are normally distributed.

According to Winarno (2011), if the probability of Jarque-Bera is significant, the data is not normally distributed. However, if the Jarque-Bera probability is not significant, the data is normally distributed. As this research uses 5% confident level, the result of Jarque-Bera probability can be interpreted as follows;

a. Jarque-Bera probability > 0.05; data is normally distributed

b. Jarque-Bera probability < 0.05; data is not normally distributed
2. Heteroscedasticity Test

To comply with BLUE parameter, data should be homoscedastic. Homoscedasticity occurs when the variance of errors is constant. When the dispersion of error term’s probability distribution is not constant, there exists heteroscedasticity. Heteroscedasticity implies on the variances of error term’s probability distributions. The presence of heteroscedasticity may lead to invalidity of hypotheses testing and forecast inefficiency (Gau, 2002). A good regression model which is acceptable shows homoscedasticity instead of heteroscedasticity (Santoso, 2010).

This research employs White test to act on the heteroscedasticity that may causes trouble in hypothesis testing. White test was developed by Halbert White in 1980 and a widely used for detecting heteroscedasticity (Birau, 2012).

3. Autocorrelation Test

Autocorrelation refers to the correlation between members of series of observations in time series data or in cross-sectional data (Gujarati, 2004). To comply with the BLUE parameter, there shouldn’t be correlation error among observations. The classical linear regression model assumes there’s no correlation in the disturbances of observation (Gujarati, 2004). Therefore, if correlation exists, it indicates a problem of autocorrelation in which the sequential observations over time are related to each other. The autocorrelation in the residuals is measured by Durbin-Watson statistic. Durbin-Watson can be formulated as follows (Schwert, 2010);

\[
Durbin\ Watson = \frac{\sum_{t=2}^{T}(\hat{e}_t - \hat{e}_{t-1})^2}{\sum_{t=1}^{T} \hat{e}_t^2}
\]

(Eq. 11)

Where:
\( \hat{e}_t = (Y_t - \bar{y}) = \text{residual at time } t \)

T = number of time periods

According to Santoso (2010), the value of Durbin-Watson should be more than -2 and less than 2, as detailed as follows;

a. Durbin-Watson statistic < -2; positive autocorrelation exists.
b. -2 < Durbin-Watson statistic < 2; no autocorrelation exists.
c. Durbin-Watson statistic > -2; negative autocorrelation exists.

4. Multicollinearity Test

The term multicollinearity refers to exact linear relationship among some or all explanatory variables used in the regression model (Gujarati, 2004). Multicollinearity is also defined as a state in which high degree of correlation is present among independent variables. It commonly happens when a large number of independent variables is involved in the regression model. It makes some of the independent variables measure the same concept of phenomena and thus, causes multicollinearity (Jeeshim, 2002). Multicollinearity can also be caused by some factors such as the data collection method employed, constraints in the model of the population, model specification, overdetermined model, and the regressors included in the model shows a common trend, which means, the regressors decrease or increase over time. A serious multicollinearity may result in statistically insignificant variables, not because te variable is really insignificant, but because the sample does not allow the assessment of separate impact of independent variable towards dependent variable (Gujarati, 2004).

According to Heinecke (2011), multicollinearity can be assessed by analyzing the correlation matrix. The correlation coefficient shown by R value and its interpretation are detailed as follows;
Table 3.2. Interpretation of $R^2$

<table>
<thead>
<tr>
<th>R Value</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R \leq 0.3$</td>
<td>Very weak correlation</td>
</tr>
<tr>
<td>$0.3 \leq R \leq 0.5$</td>
<td>Weak Correlation</td>
</tr>
<tr>
<td>$0.5 \leq R \leq 0.7$</td>
<td>Moderate correlation</td>
</tr>
<tr>
<td>$0.7 \leq R \leq 1$</td>
<td>Strong correlation</td>
</tr>
</tbody>
</table>

*Source: Moore & Flinger, 2013*

According to table 3.2., strong correlation exists when the R value is more than 0.7. Therefore, to avoid multicorrelation effect, the R value should be less than 0.7 (Heinecke, 2011).

### 3.7.4 Multiple Regression Analysis

Multiple regression analysis is employed when the study consists of more than one independent variable. If the study only consists of one independent variable in the regression model, it is said to be single regression analysis, which is also known as two-variable regression analysis (Gujarati, 2004). Multiple regression is widely used as statistical method to describe relationship between and one or more independent variables and a continuous outcome variable in an equation (Salam, 2008).

Since this study has 4 (four) independent variables, multiple regression analysis is chosen in this research. The linear regression equation that describes the influence of independent variables on dependent variables can be written as follows;

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon$$

*(Eq. 12)*
Where:

\[ Y = \text{Dependent variable; Debt to assets ratio} \]

\[ \beta_0 = \text{Intercept/constant (value of } Y \text{ when } X_1, X_2, X_3, \text{ and } X_4 \text{ equals to zero)} \]

\[ \beta_1 - \beta_4 = \text{Partial regression coefficient} \]

\[ X_1 = \text{Independent variable; Return on Assets} \]

\[ X_2 = \text{Independent variable; Current Ratio} \]

\[ X_3 = \text{Independent variable; Firm size} \]

\[ X_4 = \text{Independent variable; Asset Tangibility} \]

\[ \epsilon = \text{Random error} \]

According to Schwert (2010), the value of \( \beta_1 - \beta_4 \) shows the marginal contribution of each independent variable towards the dependent variable, assuming the other variables are constant. The positive and negative sign of partial regression coefficient represents the kind of effect that the independent variables have on the dependent variable. If the value of \( \beta \) is negative, it means the independent variable is negatively correlated to the dependent variable, and vice versa.

### 3.8 Testing the Hypothesis

Hypothesis testing provides formal framework of whether or not to accept a hypothesis on parameters, depending on the supporting data. P-value is included in the test to quantify the chances of false rejection which is caused by data randomness. The concept of statistical significance is used in quantifying these probabilities (Kaltenbach, 2012).
Basically, there are 2 types of hypothesis; null hypothesis and alternative hypothesis. Null hypothesis is the stated hypothesis, denoted by $H_0$. Null hypothesis is the opposite of alternative hypothesis, also known as maintained hypothesis, which is denoted by $H_a$ (Gujarati, 2004).

In this research, null hypothesis states that there’s no significant effects among variables, while alternative hypothesis states that there’s significant effect among variables.

According to Hans & Kaltenbach (2012), the general procedure of hypothesis testing can be elaborated as follows:

- Clarifying assumptions of variables, sample size, and other data needed in the observation.
- Formulating hypothesis (both null and alternative hypothesis)
- Choosing a test statistic
- Deriving the null distribution under the assumption held by null hypothesis
- Computing the test statistic value
- Computing the $p$-value
- Comparing the $p$-value with significant level

### 3.8.1 Significant Level

$P$-value, also known as the calculated probabilities, can be an indicator whether or not to accept null hypothesis. The test in this research is conducted under 5% significance level, which will be compared to the $p$-value. If the $p$-value more than the significant level, it means the null hypothesis is rejected. Rejection in null hypothesis automatically means accepting alternative hypothesis (Hans & Kaltenbach, 2012).

### 3.8.2 T-Test

$T$-test is conducted to analyze the effect of an independent variable towards the dependent variable (Sarwono, 2006). $T$-test is not suitable for non-
formal data and the normality of the data should be checked before doing t-test because this test assumes the distribution to be normal (Hans & Kaltenbach, 2012).

According to Gujarati (2004), the formula of t-test used in regression analysis can be written as follows;

\[ t = \frac{(β_i - β_0)}{se(β_i)} \]  

(Eq. 13)

Where:

- \( β_i \) = parameters of the model; the intercept and slope coefficient
- \( β_0 \) = estimator of \( β_i \)
- \( se \) = standard error

To determine whether or not the null hypothesis should be rejected, the probability value of t-statistics is compared with the significant level. If p-value of t-statistics exceeds the significant level, the null hypothesis is rejected, and vice versa (Gujarati, 2004). Since this research uses 5% significance level, the result of t-statistics can be interpreted as follows;

a. P-value of t-statistics > 0.05; null hypothesis (H\(_0\)) is accepted and alternative hypothesis (H\(_a\)) is rejected. It means the independent variable does not have significant effect towards the dependent variable.

b. P-value of t-statistics < 0.05; null hypothesis (H\(_0\)) is rejected and alternative hypothesis (H\(_a\)) is accepted. It means the independent variable has significant effect towards the dependent variable.

As t-statistics explain the partial effect of dependent variables towards independent variable and this research uses 5% significant level, the hypotheses of t-test in this research can be written as follows;
a. Null hypothesis (H₀₁) : β₁ = 0  
Probability of t-statistics > 0.05; There is no significant influence of return on assets towards debt to assets ratio of companies in mining sector.

Alternative hypothesis (Hₐ₁) : β₁ ≠ 0  
Probability of t-statistics < 0.05; There is significant influence of return on assets towards debt to assets ratio of companies in mining sector.

b. Null hypothesis (H₀₂) : β₂ = 0  
Probability of t-statistics > 0.05; There is no significant influence of current ratio towards debt to assets ratio of companies in mining sector.

Alternative hypothesis (Hₐ₂) : β₂ ≠ 0  
Probability of t-statistics < 0.05; There is significant influence of current ratio towards debt to assets ratio of companies in mining sector.

c. Null hypothesis (H₀₃) : β₃ = 0  
Probability of t-statistics > 0.05; There is no significant influence of firm size towards debt to assets ratio of companies in mining sector.

Alternative hypothesis (Hₐ₃) : β₃ ≠ 0  
Probability of t-statistics < 0.05; There is significant influence of firm size towards debt to assets ratio of companies in mining sector.

d. Null hypothesis (H₀₄) : β₄ = 0  
Probability of t-statistics > 0.05; There is no significant influence of assets tangibility towards debt to assets ratio of companies in mining sector.

Alternative hypothesis (Hₐ₄) : β₄ ≠ 0  
Probability of t-statistics < 0.05; There is significant influence of assets tangibility towards debt to assets ratio of companies in mining sector.
3.8.3 F-Test

According to Sarwono (2006), F-test is employed to analyze the simultaneous relationship between set of independent variables towards the dependent variable. In term of linear regression analysis, F-test is used for analysis of variance (ANOVA). In multiple regression, the formula of $f_{count}$ can be written as follows (Gujarati, 2004):

$$F = \frac{R^2/(k - 1)}{(1 - R^2)/(n - k_i)}$$

(Eq. 14)

Where:

- $R^2$ = Coefficient of determination
- $n$ = Total samples
- $K$ = Number of independent variables

To determine whether or not the null hypothesis should be rejected, the probability value of t-statistics is compared with the significant level (Santoso, 2010). Therefore, the result of F-test can be interpreted as follows;

a. Probability value of F-statistics $> 0.05$; null hypothesis ($H_0$) is accepted and alternative hypothesis ($H_a$) is rejected. It means the set of independent variables does not have simultaneously significant effect towards the dependent variable.

b. Probability value of F-statistics $< 0.05$; null hypothesis ($H_0$) is rejected and alternative hypothesis ($H_a$) is accepted. It means the set of independent variables have simultaneously significant effect towards the dependent variable.
As F-test explain the simultaneous effect of dependent variables towards independent variable and this research uses 5% significant level, the hypotheses of t-test in this research can be written as follows;

a. Null hypothesis (H_{0}) : \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0
   Probability of t-statistics > 0.05; There is no significant simultaneous influence of return on assets, current ratio, firm size, and assets tangibility towards debt to assets ratio of companies in mining sector.

Alternative hypothesis (H_{a}) : \beta_i \neq 0
   Probability of t-statistics < 0.05; There is significant simultaneous influence of return on assets, current ratio, firm size, and assets tangibility towards debt to assets ratio of companies in mining sector.

3.8.4 Coefficient of Determination

Coefficient of determination describes how much the independent variables affect the dependent variables (Winarno, 2011). If the number of independent variables is less than two, the coefficient of determination is denoted by R^2. Adjusted R^2 is used when more than two variables are used in the regression model. Adjusted R^2 is better than R^2 because R^2 tends to give overly optimistic picture of the regression especially when the number of independent variables are more than the number of observation data. (Gujarati, 2004). Adjusted R^2 can be calculated by using the formula written as follows (Gujarati, 2004);

\[
Adjusted R^2 = 1 - (1 - R^2) \frac{n - 1}{n - k}
\]

(Eq. 15)

Where:

n = total sample

k = number of independent variables
According to Baltagi (2008), the closer the value of coefficient determination to 1, the more the independent variables can explain the variance of dependent variables because the independent variables have more capabilities to influence the dependent variable. Basically, the value of adjusted $R^2$ is within the range of 0-1. The interpretation of adjusted $R^2$ value can be written as follows:

a. If the value of adjusted $R^2$ is close to 0, the independent variables have weak explanatory power on the variance of dependent variable.

b. If the value of adjusted $R^2$ is close to 1, the independent variables have strong explanatory power on the variance of the dependent variable.
CHAPTER IV

ANALYSIS OF DATA AND INTERPRETATION OF RESULT

4.1 Company Profile

1. PT. Adaro Energy Tbk

PT. Adaro Energy is an Indonesia-based integrated coal mining company which operates under Coal Cooperation Agreement (CCA), signed on 2 November 1982. The main location of the business is in South Kalimantan. The company aims to create sustainable value from Indonesian coal and provide reliable energy to help build Indonesia. To support its aim, Adaro performs an integrated business model known as “pit-to-power” with 3 main business component, such as coal mining, mining services and logistics, and power. The company has more than 13.5 billion tonnes (Bt) of coal resources (including option to acquire 7.9 Bt) and 1.2 Bt of coal reserves. Table 4.1. is the highlight of financial performance of PT. Adaro Energy Tbk since 2012 to 2016.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
<td>6,692</td>
<td>6,734</td>
<td>6,414</td>
<td>5,959</td>
<td>6,522</td>
</tr>
<tr>
<td>Liabilities</td>
<td>3,697</td>
<td>3,539</td>
<td>3,156</td>
<td>2,606</td>
<td>2,736</td>
</tr>
<tr>
<td>Equity</td>
<td>2,995</td>
<td>3,195</td>
<td>3,258</td>
<td>3,353</td>
<td>3,786</td>
</tr>
<tr>
<td>Revenue</td>
<td>3,722</td>
<td>3,285</td>
<td>3,325</td>
<td>2,684</td>
<td>2,524</td>
</tr>
<tr>
<td>Net Profit</td>
<td>383</td>
<td>229</td>
<td>184</td>
<td>151</td>
<td>341</td>
</tr>
</tbody>
</table>


PT. Adaro Energy Tbk has been listed on IDX since 16 July 2008. The vision of the company, which is to be a leading Indonesian mining and
energy group, has led PT. Adaro Energy Tbk to be the company with the largest market capitalization in coal mining subsector in 2017.

2. PT. Medco Energi Internasional Tbk

PT. Medco Energi Internasional Tbk (MEDC) began its commercial operation in 1980. The company is engaged in exploration for and production of oil and natural gas and other energy activities, onshore and offshore drilling, and investing (direct and indirect) in subsidiaries. The company run its oil and gas operation and production in Sumatra, Kalimantan, Java, and Sulawesi. This oil and gas operation is supported by international exploration and production in overseas, such as USA, Oman, Libya, Yemen, and Tunisia. While the copper and gold mining is operated in Sumbawa Island, and coal mining in North Kalimantan. The vision of the company is to be the energy company of choice for the investors, shareholders, partners, and employees and communities where it works. The company attempts to realize its vision by developing energy resources potential into profitable investment portfolios. PT. Medco Energi International Tbk is currently the company with largest market capitalization in crude petroleum & natural gas production subsector. It has been listed in IDX since 12 October 1994. Table 4.2. is the highlight of financial performance of the company for the period 2012-2016.

Table 4.2. Financial Highlight, 2012-2016 (in millions USD)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
<td>2,656</td>
<td>2,532</td>
<td>2,702</td>
<td>2,910</td>
<td>3,597</td>
</tr>
<tr>
<td>Liabilities</td>
<td>1,813</td>
<td>1,635</td>
<td>1,782</td>
<td>2,208</td>
<td>2,707</td>
</tr>
<tr>
<td>Equity</td>
<td>843</td>
<td>897</td>
<td>920</td>
<td>702</td>
<td>891</td>
</tr>
<tr>
<td>Revenue</td>
<td>909</td>
<td>889</td>
<td>751</td>
<td>628</td>
<td>600</td>
</tr>
<tr>
<td>Net Profit</td>
<td>19</td>
<td>16</td>
<td>14</td>
<td>-186</td>
<td>187</td>
</tr>
</tbody>
</table>

3. PT. Vale Indonesia Tbk

PT. Vale Indonesia Tbk (INCO) is a company with a license from the Government of Indonesia to explore, mine, process and produce nickel, which is established in July, 1968. The business operates in Sulawesi under a Contract of Work (CoW) agreement with Indonesian Government. The CoW includes operation area of 118,435 hectares in total. The vision of the company is to be Indonesia’s number one natural resources company in creating long-term value through excellence and passion for people and the planet, according to global standards. The company has been listed on IDX since 16 May 1990 and currently is the company with largest capitalization in metal and mineral mining subsector. Table 4.3. is the highlight of financial performance of PT. Vale Indonesia Tbk for the period of 2012-2016.

Table 4.3. Financial Highlight, 2012-2016 (in millions USD)

<table>
<thead>
<tr>
<th>Year</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
<td>2,333</td>
<td>2,281</td>
<td>2,334</td>
<td>2,289</td>
<td>2,225</td>
</tr>
<tr>
<td>Liabilities</td>
<td>612</td>
<td>567</td>
<td>549</td>
<td>455</td>
<td>391</td>
</tr>
<tr>
<td>Equity</td>
<td>1,721</td>
<td>1,714</td>
<td>1,785</td>
<td>1,834</td>
<td>1,835</td>
</tr>
<tr>
<td>Revenue</td>
<td>967</td>
<td>922</td>
<td>1,038</td>
<td>790</td>
<td>584</td>
</tr>
<tr>
<td>Net Profit</td>
<td>67</td>
<td>39</td>
<td>172</td>
<td>51</td>
<td>2</td>
</tr>
</tbody>
</table>

*Source: Financial Report of PT. Vale Indonesia Tbk, 2017*

4. PT. Indo Tambangraya Megah Tbk

PT. Indo Tambangraya Megah Tbk is an Indonesian coal supplier for the world energy market which is established in 1987. With the vision of delivering sustainable, quality, and affordable energy products and services, this company has been recognized as a leading producer of coal and has built a diversified customer base. The operational areas of this company is mainly in Kalimantan. Listed on IDX on 18 December 2007, PT. Indo Tambangraya Megah Tbk currently ranks the fourth largest market capitalization in coal mining subsector. Table 4.4. is the
highlight of financial performance of PT. Indo Tambangraya Megah Tbk for the period of 2012-2016.

**Table 4.4. Financial Highlight, 2012-2016 (in millions USD)**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
<td>1,491</td>
<td>1,392</td>
<td>1,307</td>
<td>1,178</td>
<td>1,210</td>
</tr>
<tr>
<td>Liabilities</td>
<td>489</td>
<td>428</td>
<td>409</td>
<td>344</td>
<td>302</td>
</tr>
<tr>
<td>Equity</td>
<td>1,002</td>
<td>964</td>
<td>899</td>
<td>835</td>
<td>907</td>
</tr>
<tr>
<td>Revenue</td>
<td>2,439</td>
<td>2,179</td>
<td>1,943</td>
<td>1,589</td>
<td>1,367</td>
</tr>
<tr>
<td>Net Profit</td>
<td>432</td>
<td>230</td>
<td>20</td>
<td>63</td>
<td>131</td>
</tr>
</tbody>
</table>

*Source: Financial Report of PT. Indo Tambangraya Megah Tbk, 2017*

5. **PT. Benakat Integra Tbk**

PT. Benakat Integra Tbk was established on 19 April 2007. The company has been listed on IDX on 11 February 2010, and currently ranks the third largest market capitalization in crude petroleum & natural gas production subsector. Table 4.5. is the highlight of the company's financial performance from 2012 to 2016.

**Table 4.5. Financial Highlight, 2012-2016 (in millions USD)**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
<td>463</td>
<td>1,340</td>
<td>1,429</td>
<td>1,437</td>
<td>1,279</td>
</tr>
<tr>
<td>Liabilities</td>
<td>78</td>
<td>864</td>
<td>939</td>
<td>1,015</td>
<td>981</td>
</tr>
<tr>
<td>Equity</td>
<td>385</td>
<td>476</td>
<td>490</td>
<td>422</td>
<td>297</td>
</tr>
<tr>
<td>Revenue</td>
<td>37</td>
<td>191</td>
<td>262</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Net Profit</td>
<td>0.897</td>
<td>55</td>
<td>26</td>
<td>-40</td>
<td>-173</td>
</tr>
</tbody>
</table>


The basic business activities of the company include mining support service in the form of integrated coal mining infrastructure service, and exploration and production in the form of coal mining, oil, and gas. The vision of the company is to be a dynamic company that continuously
think forward to be able to optimize natural resources values through accountable business, revolutionary engineering, and innovative value added process, as well as to contribute by realizing energy conservation and building awareness of the nature preservation.

6. PT. Bayan Resources Tbk

PT. Bayan Resources Tbk, an Indonesia coal producer, was established on 7 October 2004. The company is located in East and South Kalimantan. The vision of the company is to be a highly respected coal mining company committed to delivering premium products, high quality service, and sustainable growth in the long term whilst minimizing environmental impact. PT. Bayan Resources Tbk has been listed on IDX since 12 August 2008 and currently ranks the second largest market capitalization in coal mining subsector. The financial highlight of the company from 2012 until 2016 is provided on table 4.6.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
<td>1,909</td>
<td>1,567</td>
<td>1,162</td>
<td>938</td>
<td>825</td>
</tr>
<tr>
<td>Liabilities</td>
<td>1,201</td>
<td>1,117</td>
<td>906</td>
<td>766</td>
<td>637</td>
</tr>
<tr>
<td>Equity</td>
<td>708</td>
<td>450</td>
<td>256</td>
<td>172</td>
<td>188</td>
</tr>
<tr>
<td>Revenue</td>
<td>1,423</td>
<td>1,147</td>
<td>828</td>
<td>465</td>
<td>555</td>
</tr>
<tr>
<td>Net Profit</td>
<td>55</td>
<td>-55</td>
<td>-189</td>
<td>-82</td>
<td>18</td>
</tr>
</tbody>
</table>


The company produces environmentally-friendly sub-bituminous, semi soft coking, and low-sulfur coals. It integrates coal mining, processing and logistic operations through subsidiaries which engages in various business sectors of mining, port service management, coal loading, barging, contracting and heavy equipment rentals.
7. **PT. Delta Dunia Makmur Tbk**

PT. Delta Dunia Makmur Tbk, established on 26 November 1990, is a holding company with investment focus on mining services. The operational subsidiaries include PT. Bukit Makmur Mandiri Utama (BUMA), PT. Banyubiru Sakti (BBS), and PT. Pulau Mutiara Persada (PMP). The company’s main business activities are held by BUMA, while the other two subsidiaries, BBS and PMP, are owners of coal mining concession. BUMA itself operates in coal mining contractor services and is one of the largest coal mining contractors in Indonesia by production volume. The business activities mainly take place in Kalimantan. PT. Delta Dunia Makmur is run with the vision to be leading in total mining services through long-term preferred partnerships. The company has been listed on IDX since 15 June 2001 and currently ranks the seventh largest market capitalization in coal mining industry. The financial highlight of the company for 2012 up to 2016 can be seen on table 4.7.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
<td>1,160</td>
<td>1,082</td>
<td>905</td>
<td>832</td>
<td>882</td>
</tr>
<tr>
<td>Liabilities</td>
<td>1,070</td>
<td>1,013</td>
<td>813</td>
<td>747</td>
<td>756</td>
</tr>
<tr>
<td>Equity</td>
<td>90</td>
<td>69</td>
<td>92</td>
<td>85</td>
<td>126</td>
</tr>
<tr>
<td>Revenue</td>
<td>843</td>
<td>695</td>
<td>607</td>
<td>566</td>
<td>611</td>
</tr>
<tr>
<td>Net Profit</td>
<td>-15</td>
<td>-29</td>
<td>15</td>
<td>-8</td>
<td>37</td>
</tr>
</tbody>
</table>


8. **PT. Apexindo Pratama Duta Tbk**

PT. Apexindo Pratama Duta Tbk was established on 20 June 1984. It is a drilling service contractor for exploration and production companies in Indonesia oil and gas industry. The operational location of this company is in Central Java, North Sulawesi, East Kalimantan, North Kalimantan, Banten, Batam, East Java, and South Sumatera. PT.
Apexindo Pratama Duta Tbk is considered as one of the preferred drilling contractors as it always strives to provide outstanding performance in supporting the clients’ drilling programs. The vision of the company is to be a world class drilling contractor with a quality of services without compromise. In the realization of its vision, the company succeeded with awards of numerous recognitions from reputable clients for its consistency in top quality performance. The company has been listed on IDX since 10 July 2002, and currently ranks the second largest market capitalization in crude petroleum & natural gas production subsector. The highlight of financial performance of the company for 2012-2016 is provided on table 4.8.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
<td>712</td>
<td>791</td>
<td>778</td>
<td>704</td>
<td>682</td>
</tr>
<tr>
<td>Liabilities</td>
<td>478</td>
<td>508</td>
<td>752</td>
<td>658</td>
<td>655</td>
</tr>
<tr>
<td>Equity</td>
<td>233</td>
<td>283</td>
<td>27</td>
<td>46</td>
<td>27</td>
</tr>
<tr>
<td>Revenue</td>
<td>209</td>
<td>260</td>
<td>249</td>
<td>246</td>
<td>105</td>
</tr>
<tr>
<td>Net Profit</td>
<td>23</td>
<td>49</td>
<td>-16</td>
<td>20</td>
<td>-20</td>
</tr>
</tbody>
</table>


9. PT. J Resources Asia Pasifik Tbk

PT. J Resources Asia Pasifik Tbk is an Indonesian gold mining company which started its commercial operation in 2002. As measured by global output, the company is intermediate gold producer which produces 200,000oz per annum. The vision of the company is to operate an innovative mining company, passionate about sustainability, growth, and the company’s brand. The company has been listed on IDX since 1 December 2017 and currently ranks the seventh market capitalization in metal and mineral mining subsector. The information about financial highlight of PT. J Resources Asia Pasifik Tbk for 2012-2016 is provided on the table 4.9.
Table 4.9. Financial Highlight, 2012-2016 (in millions USD)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
<td>574</td>
<td>805</td>
<td>857</td>
<td>829</td>
<td>853</td>
</tr>
<tr>
<td>Liabilities</td>
<td>289</td>
<td>546</td>
<td>571</td>
<td>512</td>
<td>511</td>
</tr>
<tr>
<td>Equity</td>
<td>286</td>
<td>259</td>
<td>285</td>
<td>317</td>
<td>342</td>
</tr>
<tr>
<td>Revenue</td>
<td>173</td>
<td>78</td>
<td>280</td>
<td>287</td>
<td>235</td>
</tr>
<tr>
<td>Net Profit</td>
<td>88</td>
<td>-26</td>
<td>26</td>
<td>31</td>
<td>22</td>
</tr>
</tbody>
</table>


10. PT. Surya Esa Perkasa Tbk

PT. Surya Esa Perkasa Tbk, established on 24 March 2006, is a major distributor and exporter for oil, gas, and petrochemical production. The company has been listed on IDX since 1 February 2012. Currently, the company ranks the fifth largest market capitalization in crude petroleum & natural gas production subsector. The financial highlight of the company for the past 5 years from 2012 until 2016 is provided on table 4.10.

Table 4.10. Financial Highlight, 2012-2016 (in millions USD)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
<td>81</td>
<td>118</td>
<td>140</td>
<td>278</td>
<td>669</td>
</tr>
<tr>
<td>Liabilities</td>
<td>29</td>
<td>28</td>
<td>40</td>
<td>95</td>
<td>459</td>
</tr>
<tr>
<td>Equity</td>
<td>52</td>
<td>90</td>
<td>100</td>
<td>183</td>
<td>210</td>
</tr>
<tr>
<td>Revenue</td>
<td>40</td>
<td>42</td>
<td>40</td>
<td>41</td>
<td>29</td>
</tr>
<tr>
<td>Net Profit</td>
<td>5</td>
<td>13</td>
<td>10</td>
<td>5</td>
<td>0.154</td>
</tr>
</tbody>
</table>


The business activities of PT. Surya Esa Perkasa Tbk include oil and natural gas refinery and processing, the exploration services for oil and gas, upstream and downstream, and actively engage in the field of renewable energy and downstream gas. The final product of the company is in the form of LPG (liquified petroleum gas) which is
usually used as material for kitchen appliances, propane which is the main LPG compiler and is used as fuels, and also condensate which is used as materials for thinner, glue, and vehicle tires. The company runs its business with a vision to be Indonesia’s leading company in term of LPG and condensate production and to participate in government mission in terms of self-sufficiency in LPG, petrochemical, chemical, and gas derivative products.

4.2 Descriptive Analysis

Descriptive statistics describes general information about variables included in the research. There are 5 variables used in this research. The dependent variable is debt to assets ratio, and the independent variables are return on assets, current ratio, firm size, and assets tangibility. The observation period is from 2012 until 2016. Therefore, this research consists of 50 data of observation. Descriptive statistics in this study uses mean to describe central tendency, and uses minimum, maximum, and standard deviation to describe dispersion. The result of descriptive statistics of data that has been processed by using Eviews can be seen on table 4.11.

<table>
<thead>
<tr>
<th></th>
<th>DA (Y)</th>
<th>ROA (X₁)</th>
<th>CR (X₂)</th>
<th>SIZE (X₃)</th>
<th>TAN (X₄)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.577053</td>
<td>0.026793</td>
<td>1.866196</td>
<td>14.02036</td>
<td>0.679907</td>
</tr>
<tr>
<td>Maximum</td>
<td>0.965738</td>
<td>0.289724</td>
<td>5.879329</td>
<td>15.72265</td>
<td>1.925455</td>
</tr>
<tr>
<td>Minimum</td>
<td>0.168657</td>
<td>-0.162714</td>
<td>0.052391</td>
<td>11.30158</td>
<td>0.001023</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.241777</td>
<td>0.071775</td>
<td>1.148519</td>
<td>0.947580</td>
<td>0.548419</td>
</tr>
<tr>
<td>Observations</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

Source: Eviews 9
Referring to table 4.11, the general information about the variables can be explained as follows:

1. Debt to assets ratio (DA), which is the dependent variable, has mean value of 0.577053, which shows the average debt to assets ratio for the 10 samples for the period of 2012-2016. Maximum value of debt to assets ratio of 0.965738, which is the ratio of PT Apexindo Pratama Duta Tbk in 2014, indicates that the company has the highest leverage ratio due to employing high level of leverage. While the minimum value of 0.168657, which is the value of PT Benakat Integra Tbk in 2012, indicates that the company has the least leverage ratio. The standard deviation value of 0.241777 for debt to assets ratio means that the data of this ratio spread ± 0.241777 from the mean value. The value of standard deviation which is smaller than the mean value indicates that the spread of data is quite narrow because debt to assets ratio does not fluctuate so much.

2. Return on assets ratio (ROA), which is the independent variable, has mean value of 0.026793, which shows the average return on assets for the 10 samples for the period of 2012-2016. Maximum value of return on assets of 0.289724, which is the ratio of PT Indo Tambangraya Megah Tbk in 2012, indicates that the company has the highest return on assets due to the company’s efficiency in utilizing its assets to generate profit. While the minimum value of -0.162714, which is the value of PT Bayan Resources Tbk in 2014, indicates that the company has least return on its assets which means the least capabilities to generate profit from its assets utilization. The standard deviation value of 0.071775 for return on assets means that the data of this ratio spread ± 0.071775 from the mean value. The value of standard deviation which is larger than the mean value indicates that the spread of data is quite wide because the value of return on assets ratio fluctuates during the observation period.
3. Current Ratio (CR), which is the independent variable, has mean value of 1.866196, which shows the average current ratio for the 10 samples for the period of 2012-2016. Maximum value of current ratio of 5.879329, which is the ratio of PT Apexindo Pratama Duta Tbk in 2012, indicates that the company has the highest current ratio due to the company’s ability to meet its short-term obligations. While the minimum value of 0.052391, which is the value of PT Benakat Integra Tbk in 2016, indicates that the company has the least liquidity which means the least capabilities to meet its short-term obligations. The standard deviation value of 1.148519 for current ratio means that the data of this ratio spread ± 1.148519 from the mean value. The value of standard deviation which is smaller than the mean value indicates that the spread of data is quite narrow because the value of current ratio doesn’t fluctuate so much.

4. Firm size (SIZE), which is the independent variable, has mean value of 14.02036, which shows the average size of the firms (measured by the natural logarithm of total assets) for the 10 samples for the period of 2012-2016. Maximum value of firm size of 15.72265, which is the ratio of PT Adaro Energy Tbk in 2013, indicates that the company is the largest in total assets. While the minimum value of 11.30158, which is the value of PT Surya Esa Perkasa Tbk in 2012, indicates that the company has the least total assets. The standard deviation value of 0.947580 for firm size means that the data of this ratio spread ± 0.947580 from the mean value. The value of standard deviation which is far smaller than the mean value indicates that the spread of data is quite narrow because the value of firm size doesn’t fluctuate so much.

5. Assets tangibility (TAN), which is the independent variable, has mean value of 0.679907, which shows the average tangibility of the 10 samples for the period of 2012-2016. Maximum value of assets tangibility of 1.925455, which is the ratio of PT Apexindo Pratama Duta
Tbk in 2016, indicates that the company has the most tangible assets. While the minimum value of 0.001023, which is the value of PT Benakat Integra Tbk in 2012, indicates that the company has the least tangible assets. The standard deviation value of 0.548419 for assets tangibility means that the data of this ratio spread ± 0.548419 from the mean value. The value of standard deviation which is smaller than the mean value indicates that the spread of data is quite narrow because the value of assets tangibility doesn’t fluctuate so much.

4.3. Data Analysis

4.3.1 Panel Data Regression

Common effects, fixed effects, and random effects are 3 basic approaches used to estimate the regression model. In order to determine which approach is best used in this research, the data will firstly be tested using Chow test and Hausman test.

1. Chow Test

Chow test is used to determine either the common effect or fixed effect is best used in the research. If the result of Chow test is not significant, common effect is chosen. However, if the result of Chow test is significant, fixed effect model is chosen and therefore, should conduct Hausman test to determine whether fixed effects or random effects is best used in the study. The result of Chow test is presented on table 4.12.

<table>
<thead>
<tr>
<th>Effects Test</th>
<th>Statistic</th>
<th>d.f.</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-section F</td>
<td>28.897789</td>
<td>(9,36)</td>
<td>0.0000</td>
</tr>
<tr>
<td>Cross-section Chi-square</td>
<td>105.355555</td>
<td>9</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Source: Eviews 9
According to table 4.12, the probability value of 0.0000 is less than significant level of 0.05. Therefore, the null hypothesis is rejected and alternative hypothesis is accepted, which means that fixed effects model is accepted in this research. However, the test should be continued to Hausman test since Chow test only covers common and fixed effects.

2. **Hausman Test**

Hausman test is conducted to know whether fixed effect or random effect that is best used in this research. The null hypothesis of Hausman test is the acceptance of random effects, and the alternative hypothesis is the acceptance of fixed effects. Therefore, if the result is significant, fixed effect will be chosen, and if the result is not significant, random effects will be chosen. The result of Hausman test is provided on the table 4.13.

**Table 4.13. Hausman Test**

<table>
<thead>
<tr>
<th>Test Summary</th>
<th>Chi-Sq. Statistic</th>
<th>Chi-Sq. d.f.</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-section random</td>
<td>16.244837</td>
<td>4</td>
<td>0.0027</td>
</tr>
</tbody>
</table>

Source: Eviews 9

The probability value of 0.0027 is less than the significant level of 0.05. The significant result means that null hypothesis is rejected and alternative hypothesis is accepted. Therefore, fixed effect is the most suitable approach in estimating regression model in this research.

4.3.2 **Classical Assumption Test**

Classical assumption test is conducted to know whether the model has fulfilled the BLUE parameter, in order to provide precise and efficient result. The classical assumption test consists of normality, heteroscedasticity, autocorrelation, and multicollinearity test.
1. Normality Test.

Normality test is conducted to know whether the data used in the observation is normally distributed or not. Basically, the normality of data can be represented in the form of graphic (histogram) or statistical data. Since the statistical data provides more specific measure, the research will provide analysis more on the statistical data of normality test, while the histogram is attached on the appendices. The analysis of the result will be focused on Jarque-Bera value and its probability value. The Jarque-Bera value should not exceed the value of \( X^2 \) table with two degrees of freedom under the significant value, and the probability should be greater than the significant value. The result of normality test is shown on table 4.14.

<table>
<thead>
<tr>
<th>Table 4.14. Normality Test Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Series:</strong> Standardized Residuals</td>
</tr>
<tr>
<td><strong>Observations:</strong> 50</td>
</tr>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>Median</td>
</tr>
<tr>
<td>Maximum</td>
</tr>
<tr>
<td>Minimum</td>
</tr>
<tr>
<td>Std. Dev.</td>
</tr>
<tr>
<td>Skewness</td>
</tr>
<tr>
<td>Kurtosis</td>
</tr>
<tr>
<td>Jarque-Bera</td>
</tr>
<tr>
<td>Probability</td>
</tr>
</tbody>
</table>

Source: Eviews 9

According to table 4.14., the Jarque-Bera value is 0.596962. While the value of \( X^2 \) table with two degrees of freedom under the significant value of 0.05 is 5.991 (referring to appendices). Since the Jarque-Bera value is less than the value of \( X^2 \) table, the data is normally distributed.

Furthermore, the normality of data is proven by looking at the probability value of 0.741944 which is more than the significant value.
used in this research, which is 0.05. According to Winarno (2011), the data is normally distributed if the probability of Jarque-Bera is more than the significant level. Therefore, the data used in this research has passed normality test and proven to be normally distributed.

2. **Heteroscedasticity Test.**

To comply with BLUE parameters, the data should be homoscedastic instead of heteroscedastic. Any heteroscedasticity indicates that the dispersion of error term’s probability distribution is not constant, which will lead to invalidity of hypothesis testing. Therefore, the heteroscedasticity should be eliminated before doing the multiple regression analysis. The researcher uses White method to eliminate heteroscedasticity of the data used in this research. The result of the eliminated heteroscedasticity is as shown on table 4.15.

![Table 4.15. White Test Result](image)

The “White cross-section standard errors & covariance (d.f. corrected)” indicates that the heteroscedasticity has been eliminated (Gujarati, 2004).

3. **Autocorrelation Test.**

Autocorrelation test is conducted to know whether there’s correlation between members of series of observation. To comply with the BLUE parameters, there should not be any autocorrelation exists. Autocorrelation test is done by analyzing the value of Durbin-Watson statistics. To claim that there’s no autocorrelation in the series of
observations, the value of Durbin-Watson statistics should be in the range between -2 and 2. The value of more than 2 indicates negative autocorrelation and the value of less than -2 indicates positive autocorrelation. The result of autocorrelation test of the data used in this research is shown on table 4.16.

Table 4.16. Autocorrelation Test Result

<table>
<thead>
<tr>
<th>Weighted Statistics</th>
<th>Durbin-Watson stat</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.103462</td>
<td></td>
</tr>
</tbody>
</table>

Source: Eviews 9

As the Durbin-Watson stat value is 1.103462 which is more than -2 but less than 2, it can be concluded that there’s no autocorrelation exists in the series of observations.

4. Multicollinearity Test

Multicollinearity test is conducted to know whether there’s any correlation among the independent variables. A good regression model should indicate no multicollinearity. To indicate that there’s no multicollinearity exists, the result of multicollinearity should not exceeds 0.7. The value over 0.7 indicates that there’s strong multicollinearity. The result of multicollinearity test for the data used in this research is shown on table 4.17.

Table 4.17 Multicollinearity Test Result

<table>
<thead>
<tr>
<th></th>
<th>ROA</th>
<th>CR</th>
<th>SIZE</th>
<th>TAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA</td>
<td>1.000000</td>
<td>0.167672</td>
<td>-0.075716</td>
<td>-0.028479</td>
</tr>
<tr>
<td>CR</td>
<td>0.167672</td>
<td>1.000000</td>
<td>0.051395</td>
<td><strong>0.362645</strong></td>
</tr>
<tr>
<td>SIZE</td>
<td>-0.075716</td>
<td>0.051395</td>
<td>1.000000</td>
<td>-0.104182</td>
</tr>
<tr>
<td>TAN</td>
<td>-0.028479</td>
<td><strong>0.362645</strong></td>
<td>-0.104182</td>
<td>1.000000</td>
</tr>
</tbody>
</table>

Source: Eviews 9
According to table 4.17., the highest value is 0.362645. The value is still far below 0.7 which means that there’s no correlation among the independent variables used in the research. In other word, the model has no multicollinearity problem in it.

4.3.3 Multiple Regression Analysis

Multiple regression is used to see partial influence of independent variables towards the dependent variable. The result of multiple regression can explain how much the change of each dependent variables contribute to the change of dependent variable. The multiple regression in this research is done by adopting fixed effects model and white cross-section method to eliminate the heteroscedasticity. The result of multiple regression is shown on table 4.18.

Table 4.18. Multiple Regression Analysis Result

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-2.577585</td>
<td>0.303492</td>
<td>-8.82250</td>
<td>0.0000</td>
</tr>
<tr>
<td>ROA</td>
<td>-0.481167</td>
<td>0.127338</td>
<td>-3.778642</td>
<td>0.0006</td>
</tr>
<tr>
<td>CR</td>
<td>-0.013434</td>
<td>0.006573</td>
<td>-2.043859</td>
<td>0.0483</td>
</tr>
<tr>
<td>SIZE</td>
<td>0.223823</td>
<td>0.021038</td>
<td>10.63911</td>
<td>0.0000</td>
</tr>
<tr>
<td>TAN</td>
<td>0.227264</td>
<td>0.027125</td>
<td>8.378452</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Source: Eviews 9

The column “Coefficient” measures the marginal contribution of independent variables to the dependent variable, holding all other variables fixed. Therefore, the multiple regression equation can be written as follows.
The eq. 16 can be explained as follows;

1. **Constanta**
   
   Constanta value of -2.677585 means that debt to total assets ratio (Y) is equal to -2.677585 when all the independent variables such as return on assets (X₁), current ratio (X₂), firm size (X₃), and assets tangibility (X₄) are equals to zero.

2. **Regression coefficient of return on assets (X₁)**
   
   The regression coefficient value of return on assets is -0.481167. The negative sign shows the negative correlation between return on assets and debt to assets ratio. Holding the other variables are constant, 1% increase in return on assets will result in 0.481167% decrease in debt to assets ratio, and vice versa.

3. **Regression coefficient of current ratio (X₂)**
   
   The result shows that the regression coefficient of current ratio is -0.013434. Since the value is negative, it means that current ratio affects debt to assets negatively. Therefore, holding the other variables are constant, 1% increase in current ratio will lead to 0.013434% decrease in debt to assets ratio, and vice versa.

4. **Regression coefficient of firm size (X₃)**
   
   The regression coefficient of firm size is 0.223823. The positive signs signal positive relationship between firm size and debt to assets ratio. It means that holding all variables are constant, 1% increase in variable size will lead to 0.223823% increase in debt to assets ratio, and vice versa.

5. **Regression coefficient of assets tangibility (X₄)**

\[ Y = -2.677585 - 0.481167X₁ - 0.013434X₂ + 0.223823X₃ + 0.227264X₄ \]

(Eq. 16)
According to the figure above, the regression coefficient of assets tangibility is 0.227264. Since the value is positive, it means tangibility variable is positively correlated with debt to assets ratio. Assuming the other variables are constant, 1% increase in tangibility ratio will lead to 0.227264% increase in debt to assets ratio, and vice versa.

4.4 Hypotheses Testing

Hypotheses testing is conducted to know whether a hypothesis is acceptable or not. By conducting hypotheses testing, information about variables that have significant effect on debt to assets ratio can be obtained. The hypotheses are tested using T-test and F-test. The ability of the independent variable to explain the variance in debt to assets ratio are then assessed through the coefficient of determination, denoted with $R^2$.

4.4.1 T-test

T-test is conducted to know whether there’s any significant influence between independent variables towards debt to assets ratio as dependent variable in this research. This test is done by comparing the probability value of t-statistics with the significant level of 0.05. If the probability value of t-statistics is more than 0.05, then the null hypothesis is accepted and the related independent variable is considered insignificant. While if the probability value of t-statistics is less than 0.05, then the alternative hypothesis is accepted and the related independent variable is considered significant. The results of T-test of this research is provided on table 4.19.
Table 4.19. T-Test Result

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-2.677585</td>
<td>0.303492</td>
<td>-8.822590</td>
<td>0.0000</td>
</tr>
<tr>
<td>ROA</td>
<td>-0.481167</td>
<td>0.127338</td>
<td>-3.773642</td>
<td>0.0006</td>
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<tr>
<td>CR</td>
<td>-0.013434</td>
<td>0.006573</td>
<td>-2.043859</td>
<td>0.0483</td>
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<tr>
<td>SIZE</td>
<td>0.223823</td>
<td>0.021038</td>
<td>10.63911</td>
<td>0.0000</td>
</tr>
<tr>
<td>TAN</td>
<td>0.227264</td>
<td>0.027125</td>
<td>8.378452</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Source: Eviews 9

The T-test result on Table 4.19 can be explained as follows;

1. The probability value of return on assets is 0.0006, which is less than 0.05. Therefore, null hypothesis is rejected and alternative hypothesis is accepted. It means that return on assets has significant influence on debt to assets ratio in mining sector.

2. The probability value of current ratio is 0.0483, which is less than 0.05. Therefore, null hypothesis is rejected and alternative hypothesis is accepted. It means that current ratio has significant influence on debt to assets ratio in mining sector.

3. The probability value of firm size is 0.0000, which is less than 0.05. Therefore, null hypothesis is rejected and alternative hypothesis is accepted. It means that firm size has significant influence on debt to assets ratio in mining sector.

4. The probability value of assets tangibility is 0.0000, which is less than 0.05. Therefore, null hypothesis is rejected and alternative hypothesis is accepted. It means that assets tangibility has significant influence on debt to assets ratio in mining sector.
Basically, the insignificant variables will be eliminated from the regression equation. But since the T-test result shows that there’s no insignificant variables, the equation of regression remains the same, and can be re-written as follows.

\[
DA = \text{-2.677585} - 0.481167 \text{ ROA} - 0.013434 \text{ CR} + 0.223823 \text{ SIZE} + 0.227264 \text{ TAN}
\]

(Eq. 17)

4.4.2 F-Test

F-test is employed to know whether a set of independent variables has simultaneous significant relationship towards debt to assets ratio as the dependent variable of this research. F-test is done by comparing the probability value of F-statistics with significant value of 0.05. If the probability F-stat is more than 0.05, the null hypothesis is accepted and the simultaneous relationship is considered does not exist. While if the probability value of F-stat is less than 0.05, the alternative hypothesis is accepted and the simultaneous relationship is recognized. Table 4.20. shows the result of F-test of the data used in this research.

<table>
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<th>Weighted Statistics</th>
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<tr>
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<tr>
<td>Probability</td>
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*Source: Eviews 9*

Based on the result, the probability value of 0.000000 is less than 0.05. Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted. It means that the set of independent variables have simultaneous significant influence towards the dependent variable. In other word, return
on assets, current ratio, firm size, and assets tangibility altogether have simultaneous significant influence on debt to assets ratio in mining sector.

4.4.3 Coefficient of Determination

Coefficient of determination is used to assess the capabilities of independent variable to explain the variance in debt to assets ratio as the dependent variable. Since this research uses more than 2 independent variables, the analysis will be focused on the adjusted $R^2$ instead of $R^2$. The result of coefficient of determination of this research is shown on the table 4.21.

<table>
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<th>Weighted Statistics</th>
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<td>R-squared</td>
<td>0.932056</td>
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<tr>
<td>Adjusted R-squared</td>
<td>0.907521</td>
</tr>
</tbody>
</table>

*Source: Eviews 9*

Coefficient of determination which is close to 1 indicates strong capability to influence dependent variable (Baltagi, 2008). According to the table above, the coefficient of determination of this research is 0.907521, which is close to 1, indicating that return on assets, current ratio, firm size, and assets tangibility have strong capabilities in influencing debt to assets ratio. This value of 0.907521 means that 90.7521% of the variance in debt to assets ratio can be explained by return on assets, current ratio, firm size, and assets tangibility altogether. In other words, all independent variables influence debt to assets ratio simultaneously by 90.7521%.
4.5 Interpretation of Results

1. The effect of return on assets towards debt to assets ratio

Since the probability of t-stat of return on assets is 0.0006, the alternative hypothesis is accepted. The regression coefficient shows that return on assets affects debt to equity ratio negatively. The finding of this research is that the firms use its profit as the main source of funds before deciding to use debt. In other words, the more profitable the firm is, the less it uses leverage.

This finding is in favor of Pecking Order Theory which states that when funds are needed, firms have an order of preference. Firms would firstly prefer using internal funds, and if internal funds are not sufficient so the external sources of funds are needed, firms would firstly prefer debt, and then equity (Myers & Majluf, 1984). Higher profitability gives more retained earnings, so firms can rely more on its internal financing. This will result in less need for external financing, so firms wouldn’t employ debt financing as much as it would do if the profitability was low. This result is in line with the finding of Dewi & Lestari (2014) and Alzomaia (2004) which showed that firms with more profitability tends to employ less leverage as they have more retained earnings to support its internal growth.

2. The effect of current ratio towards debt to assets ratio

Since the probability of t-stat of current ratio is 0.0483, the alternative hypothesis is accepted. The regression coefficient shows that current ratio has negative significant relationship towards debt to equity ratio. The finding of this research is that the firms use its liquid assets to serve as internal source of funds. Therefore, the more liquid the firms are, the less debt is needed.

This finding is in favor of Pecking Order Theory which states that firms will firstly use internal funds before external funds. The more liquid the
company, the more accumulated cash and other liquid assets can serve as internal financing. This condition lowers the tendency of firms issuing debt, compared with the firms that do not have enough liquid assets that can serve as its internal source of finance. This result is in line with the research conducted by Singh (2006), Sheikh and Wang (2011), Pattweekongka & Napompech (2014), and Ridloah (2010) which shows that firms with more liquid assets employs less leverage.

3. **The effect of firm size towards debt to assets ratio**

Since the probability of t-stat of firm size is 0.0000, the alternative hypothesis is accepted. The regression coefficient shows that firm size affects debt to equity ratio positively. The finding of this research is that firms which are larger in total assets have more access to external funds, and therefore, are more leveraged.

This finding is in favor of Trade-Off Theory which states that the employment of debt considers the benefit of taking debt and the cost or risk associated to the debt. Since larger firms are more diversified, they have less risk of bankruptcy. The reduced bankruptcy risk gives more chance to take more debt. Moreover, larger firms may incur lower transaction cost associated with debt, and lower information cost because larger firms have better quality of financial information (Psillaki & Daskalakis, 2009). Good quality of financial information and more diversified condition will attract creditors, so larger firms will have more chances of raising debt with less risk of bankruptcy compared to the smaller firms. This suggests positive relationship between size and leverage. This result is in line with the previous research done by Singh (2016), Sheikh & Wang (2011), Dewi & Lestari (2014), and Alzomaia (2014), which showed that larger firms employs more leverage compared with smaller firms.

In the contrary, the finding of Qian, et al. (2009) and Ridloah (2010) showed that larger firms employ less leverage because they have less
information asymmetry. Less informational asymmetry means less assumption that the managers have much of the inside information that the stockholders do not know. It makes the stockholders, either the new stockholders and the old stockholders won’t perceive the stock issuance as negative signal. This makes larger firms have more chance of equity financing through share issuance and therefore, are less leveraged.

4. The effect of assets tangibility towards debt to assets ratio

Since the probability of t-stat of assets tangibility is 0.0000, the alternative hypothesis is accepted. The regression coefficient shows that tangibility affects debt to equity ratio positively. The finding of this research is that firms with more collateralizable assets have more access to employing debt. In other words, firms with more tangible assets are more leveraged.

This is in favor of Trade-Off Theory which explains that companies with higher tangible assets can provide more collateral to the creditors. The more collateral assets will attract more creditors as it provides security to the creditors in case of bankruptcy. The more collateral assets also increases the chance of the company to borrow at lower rate of interest, which encourages the company to use more debt. This finding is in line with the research of Pattweekongka & Napompech (2014) which showed that assets tangibility increases the firms’ access to debt financing.

In the contrary, the study of Sheikh & Wang (2011), Dewi & Lestari (2014), Alzomaia (2014), and Qian, et al. (2007) found that assets tangibility is negatively correlated with debt to assets ratio because firms with less tangible assets are more sensitive to informational asymmetry that will cause the stockholders to perceive negative signal if the firm is issuing stock. Therefore, firms with less tangible assets will choose to raise debt.
5. **Simultaneous effect of return on assets, current ratio, firm size, and assets tangibility towards debt to assets ratio.**

The set of independent variables such as return on assets, current ratio, firm size, and assets tangibility have strong simultaneous relationship towards the debt to assets ratio with 0.907521 value of adjusted R\(^2\). The independent variables altogether affect debt to assets ratio by 90.7521%. The F-test result with probability of 0.000000 which also explain that this simultaneous effect is significant.
CHAPTER V

CONCLUSIONS AND RECOMMENDATION

5.1 Conclusions

This research is conducted to examine the effect of return on assets, current ratio, firm size, and assets tangibility towards debt to assets ratio of the companies in mining sector in Indonesia during 2012-2016. By using purposive sampling method, 10 companies are selected as sample. The data is processed in multiple regression model by adopting fixed effect model with classical assumption test beforehand. The findings of this research can be detailed as follows;

1. Return on assets has negative significant influence on debt to assets ratio. It is found that the more profitable the company is, the more it has retained earnings as source of funds. The availability of internal financing decrease the need of debt financing, and therefore firms with more profitability are less leveraged.

2. Current ratio has negative significant influence on debt to assets ratio. It is found that the more liquid a company is, the more it has liquid assets to cover the needs of funds and serve as internal financing. As the internal financing is more sufficient, the less debt is needed. Therefore, firms with more liquidity employ less leverage.

3. Firm Size has positive significant influence on debt to assets ratio. It is found that larger firms are more diversified, so they are less prone to the bankruptcy risk, and therefore, can take more debt compared to the smaller firms. Larger firms also have better financial information which will attract more creditors and therefore, have more access to debt financing.

4. Assets Tangibility has positive significant influence on debt to assets ratio. The more tangible assets owned by the company, the more it has
assets to be used as collateral which provide security for the creditors, and therefore the companies can borrow at lower interest rate. The advantage of cheaper cost of debt will encourage the company to borrow more.

5. All of independent variables altogether have significantly simultaneous effect towards debt to equity ratio of companies in mining sector. Return on assets, current ratio, firm size, and assets tangibility influence 90.7521% of debt to assets ratio which is indicated as a strong influence.

According to the findings, it can be interpreted that return on assets, current ratio, firm size, and assets tangibility are important firm-specific determinants of leverage. Therefore, those factors should be consideration of financial managers when taking leverage decision, considering that leverage decision is critical since the risk of taking leverage can affect the continuance of the business.

5.2 Recommendation

1. Mining Companies

As leverage decision is critical, profitability, liquidity, firms size, and assets tangibility should be considered in taking leverage decision. If the firms are relatively small and have less tangible assets, it would be better if the firms avoid taking too much debt, due to the less assets that can be collateralized and could expose the firm to the risk of bankruptcy. It would be better for smaller firms with less tangible assets to improve its profitability and liquidity in order to provide internal source of funds, so the use of debt can be minimized. Firms also need to increase the retained earnings as it will be useful the firms’ internal growth. However, for the larger firms and firms with high tangible assets that have more access to external source of funds, the leverage decision should also consider the risk and cost of debt, and make sure that the
level of leverage being employed is in optimum level, and not in excessive amount.

2. **Investors**

Investors should check the company’s capital structure before deciding where to invest, to see the leverage employed by the company. Firms employing high level of leverage will signal a risky investment to the investor. However, the investor should compare the leverage ratio with the average of the industry, considering also the other factors of that contribute to the high leverage. As the optimum level of leverage varies across firms, a high level of leverage doesn’t necessarily mean that it is a bad investment due to the variations in factors that affect the leverage decision. Therefore, deeper analysis should be done when assessing company’s capital structure.

3. **Future Researchers**

As this research is using quantitative methods, the future researchers can improve the research by using qualitative method, and expand the observation period to more than 5-year period, which will provide more data to be observed.
BIBLIOGRAPHY

Books


**Journals/ Articles/ Reports/ Working Papers**


Theses


Websites/ Electronic Sources


APPENDICES

Appendix 1: Histogram

Source: Eviews 9

Appendix 2: Scatter Plot

Source: Eviews 9
Appendix 3: Eviews Fixed Effect Regression

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
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<tbody>
<tr>
<td>C</td>
<td>-2.677585</td>
<td>0.303492</td>
<td>-8.822590</td>
<td>0.0000</td>
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<tr>
<td>ROA</td>
<td>-0.481167</td>
<td>0.127338</td>
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<td>CR</td>
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<td>TAN</td>
<td>0.227264</td>
<td>0.027125</td>
<td>8.378452</td>
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</tr>
</tbody>
</table>

Effects Specification

| R-squared         | 0.932056 | Mean dependent var | 0.577053 |
| Adjusted R-squared| 0.907521 | S.D. dependent var  | 0.241777 |
| S.E. of regression | 0.073525 | Akaike info criterion | -2.150882 |
| Sum squared resid  | 0.194614 | Schwarz criterion   | -1.615516 |
| Log likelihood     | 67.77206 | Hannan-Quinn criter. | -1.947012 |
| F-statistic        | 37.98852 | Durbin-Watson stat  | 1.103462 |
| Prob(F-statistic)  | 0.000000 |                    |         |

Source: Eviews 9
APPENDIX 4: $\chi^2$ Table

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APPENDIX 5: Raw Data

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3. PT. Vale Indonesia Tbk. (INCO)
4. PT. Indo Tambangraya Megah Tbk. (ITMG)
5. PT. Benakat Integra Tbk. (BIPI)
6. PT. Bayan Resources Tbk. (BYAN)
7. PT. Delta Dunia Makmur Tbk. (DOID)
8. PT. Apexindo Pratama Duta Tbk (APEX)
9. PT. J Resources Asia Pasifik Tbk. (PSAB)
10. PT. Surya Esa Perkasa Tbk. (ESSA)