THE INFLUENCE OF SIZE EFFECT TOWARDS THE SIGNIFICANCE OF THE USE OF FINANCIAL RATIOS IN PREDICTING CORPORATE FINANCIAL DISTRESS

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This is to state that this thesis does not contain work that has previously been submitted to obtain any degree at any higher educational establishment, and to the best of my knowledge does not contain the previously published work nor opinion of any other person, with the exception on those cited in writing in this paper and acknowledged in the bibliography.

Yogyakarta, December 22, 2008

Retnowulan

DREAMS

All people dream, but not equally.
Those who dream by night in the dusty recesses of their mind,
Wake in the morning to find that it was vanity.

But the dreamers of the day are dangerous people,
For they dream with open eyes,
And make them come true.

~ D.H. Lawrence ~

A man of sense is never discouraged by difficulties;
He redoubles his industry and his diligence, he perseveres,
And infallibly prevails at last.

~ Lord Chesterfield ~

There is only one happiness in life: to love and be loved.

~ George Sand ~

dedicated to :

my beloved parents
and myself

PREFACE

I present my highest gratitude and praise to **Jesus Christ** for His love, blessings, and guidance, which made me persevere in writing this thesis. My second gratitude goes to **Holy Mary** for having listened to my prayer and conveying my prayer to God.

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I wish to devote my special thanks to my beloved parents. First, I am always thankful to my mother, **Maria Emerentiana Handayani**, for caressing me with her love, constant support and huge patience in "lifting" me up and enlightening my spirit in my hardest times. Second, I do believe that my father,

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ABSTRACT

This thesis attempts to figure out the influence of size effect towards the significance of the use of financial ratios in predicting corporate financial distress. Financial distress refers to the financial condition in which a firm gains negative net income for several consecutive years. Due to the detrimental impact of financial distress, researches have been conducted in the area of financial distress and bankruptcy prediction in order to find tools and instruments used to predict the likelihood of the occurrence of financial distress. Financial ratio emerges as a widely used measure of financial distress and bankruptcy prediction. As reflected in financial ratios, signs of potential corporate financial distress are evident several years before the actual financial distress materializes. Hence accurate prediction of financial distress allows the distress companies to take preventive and corrective actions.

There are two problems in this study : (1) the difference between financial ratios at large and small non-distress and distress firms. (2) the significance of financial ratios to predict financial distress at large and small firms. The first problem is solved by testing the difference between financial ratios of large and small, non-distress and distress firms. If there is a difference between financial ratios at large and small, non-distress and distress firms, it proves that financial ratio can be used in the prediction of financial distress. The test of difference is conducted using Mann-Whitney U test for two-independent sample. The second problem is solved by performing binary logistic regression in order to assess the level of significance of the use of financial ratios in the prediction of financial distress.

The analysis results in one finding. The finding reveals that there is no statistical difference between financial ratios of non-distress and distress firms which are divided into large and small firms. Due to this result, the logistic regression is not performed and the research ends at this stage.

Finally, the result of this research leads to two conclusions. First, since there is no statistical difference between financial ratios of non-distress and distress firms which are divided into large and small firms, the financial ratios cannot be used as measure of financial distress for real estate and property firms and firm size does not affect the use of financial ratio in such prediction. Second, financial ratio does not always be a predictor of financial distress for real estate and property firms at all observation period of time because the financial performance of real estate and property firms is affected not only by intrinsic factors but also extrinsic factors such as macroeconomic condition, political situation, and environmental condition, which change over time.

Keywords: *financial distress, size effect, financial ratio, real estate and property, Mann-Whitney U test, binary logistic regression*

INTISARI

Tesis ini bertujuan untuk mengungkap pengaruh ukuran perusahaan terhadap signifikansi penggunaan rasio keuangan dalam memprediksi kondisi financial distress dalam perusahaan. Financial distress adalah suatu kondisi keuangan dimana suatu perusahaan membukukan rugi bersih selama beberapa tahun berturut-turut. Oleh karena dampak financial distress yang sangat merugikan, berbagai riset dalam bidang pengamatan prediksi financial distress dan kebangkrutan telah banyak dilakukan dalam rangka menemukan alat dan ukuran yang dapat digunakan untuk memprediksi kemungkinan terjadinya financial distress. Rasio keuangan menjadi ukuran yang banyak digunakan dalam prediksi financial distress dan kebangkrutan. Sebagaimana yang tercermin dalam rasio keuangan, tanda-tanda kemungkinan terjadinya financial distress pada perusahaan telah terlihat sejak beberapa tahun sebelum financial distress terjadi. Oleh karena itu, prediksi yang akurat terhadap kemungkinan terjadinya financial distress akan membantu perusahaan dalam mengambil tindakan pencegahan maupun perbaikan.

Ada dua permasalahan dalam studi ini: (1) perbedaan antara rasio keuangan perusahaan besar dan kecil yang tidak mengalami financial distress and yang mengalami financial distress (2) signifikansi penggunaan rasio keuangan untuk memprediksi financial distress pada perusahaan besar dan kecil. Permasalahan pertama diselesaikan dengan menguji perbedaan antara rasio keuangan perusahaan besar dan kecil yang tidak mengalami financial distress and yang mengalami financial distress. Jika terdapat perbedaan antara rasio keuangan perusahaan besar dan kecil yang tidak mengalami financial distress dan yang mengalami financial distress, maka terbukti bahwa rasio keuangan dapat digunakan untuk memprediksi financial distress pada perusahaan besar dan kecil dan ukuran perusahaan berpengaruh terhadap prediksi financial distress. Uji beda dilakukan dengan menggunakan uji Mann-Whitney U untuk dua sampel yang berbeda. Permasalahan kedua diselesaikan dengan melakukan regresi logistik binari untuk menguji tingkat signifikansi penggunaan rasio keuangan dalam memprediksi terjadinya financial distress.

Hasil analisis mengungkapkan bahwa tidak ada perbedaan statistik antara rasio keuangan perusahaan besar dan kecil yang tidak mengalami financial distress and yang mengalami financial distress. Hasil analisis tersebut membuat regresi logistik binari tidak dapat dilakukan dan riset berhenti pada tahap ini.

Akhirnya, hasil riset menghasilkan dua kesimpulan. Pertama, karena tidak ada perbedaan statistik antara rasio keuangan perusahaan besar dan kecil yang tidak mengalami financial distress and yang mengalami financial distress, rasio keuangan tidak dapat digunakan untuk mmprediksi terjadinya financial distress pada perusahaan real estate dan properti dan ukuran perusahaan tidak berpengaruh dalam prediksi tersebut. Kedua, rasio keuangan tidak selalu dapat menjadi alat untuk memprediksi terjadinya financial distress pada perusahaan real estate dan property dan di setiap periode waktu pengamatan karena kinerja keuangan perusahaan pada sektor industri real estate dan properti dapat dipengaruhi tidak hanya oleh faktor-faktor intrinsik perusahaan namun juga oleh faktor-faktor

ekstrinsik perusahaan seperti kondisi ekonomi makro, situasi politik, dan kondisi lingkungan alam, yang berubah sepanjang waktu.

Keywords: *financial distress, size effect, financial ratio, real estate and property, Mann-Whitney U test, binary logistic regression*

CHAPTER I

INTRODUCTION

A. Research Background

The impact of monetary crisis peaked in 1998 put a catastrophe to firms in all industry sectors, yet few managed to survive. As several industries collapsed, firms were bankrupt and banks merged. The monetary crisis seems to have left a trail of predicaments to the business world in Indonesia. The grown complexity of national economic crisis still poses a lot of challenges for businesses in every industry sector today, as firms struggle to manage corporate finance.

Failure in corporate financial management often results in financial distress. Financial distress is often defined as the financial condition in which a firm gains negative net income for several consecutive years. Financial distress poses a lot of threats to the firms. Financial distress incurs costs of financial distress. Financial distress imposes barriers for the firms to grow because strategies may not be feasible to implement due to financial limitation. Financial distress leads to two possible results, recovery or bankruptcy. If financial distress persists, companies will go into bankruptcy. Thus it is said that financial distress may precede bankruptcy (Platt and Platt, 2002).

The detrimental impact of financial distress has triggered researches in the area of financial distress and bankruptcy prediction. Finance analysts have put their best efforts to find tools and instruments used to predict the likelihood of the occurrence of financial distress. Studies have shown that financial ratios have

been used in various prediction models of financial distress as well as bankruptcy prediction models. As reflected in financial ratios, signs of potential corporate financial distress are evident several years before the actual financial distress materializes. Hence accurate prediction of financial distress allows the distress companies to take preventive and corrective actions. Several important studies include those by Beaver (1960s), Altman (1968s), Deakin (1972), Hall and Byron (1992), and Tan and Dihardjo (1997). In Indonesia, there are also some studies in this are such as those by Almilia and Kristijadi (2003), Almilia and Herdiningtyas (2005), and Almilia (2006).

Beaver is the pioneer in the development of prediction model of financial distress. In the late 1960's Beaver conducted a research using univariate analysis to identify bankruptcy predictors. Beaver included ratio analysis to identify several indicators of failure. Beaver's univariate analysis then inspired the development of multivariate analysis of financial distress and bankruptcy prediction in subsequent studies.

Altman is well known for his bankruptcy prediction model called Altman's Z-Score, which later was developed into ZETA model by Altman, Haldeman and Narayanan. Altman's Z-Score includes five measures and each measure is weighted. Unlike Beaver's single predictor model, Z-Score is based on discriminant analysis.

Deakin went further by developing Beaver's univariate analysis of financial distress into multivariate analysis. He put 14 variables found in Beaver's analysis into his own multivariate discriminant model. The result was that

financial ratios potentially serve as predictors of bankruptcy, with profitability ratios, liquidity ratios, and solvency ratios as the most significant indicators.

Hall and Byron conducted a research using probit model with thirteen financial ratios to predict financial distress among credit unions in New South Wales, Australia. The result of Hall and Byron's research showed that only four ratios have significant predictive power of financial distress. The four ratios were Required Doubtful Debt Provision, Permanent Share Capital + Reserves + Over provision for Doubtful Debt to Total Assets, Operating Surplus to Total Assets, and Operating Expenses to Total Assets.

Tan and Dihardjo once tested the prediction model of financial distress using Artificial Neural Network (ANN). The use of Artificial Neural Network in this research involves artificial intelligence device. While it was evident that probit model was superior to linear discriminant model, ANN model proved to be even better than probit model.

In 2003, Almilia and Kristijadi conducted research on financial distress prediction using financial ratios. The sample in this research was limited only to manufacturing firms listed at Jakarta Stock Exchange. Extending this study to different sample firms, in 2005 Almilia and Herdiningtyas analyzed the use of CAMEL ratios in the bankruptcy and financial distress prediction of banks in Indonesia. The latest work by Almilia in 2006 was a research on prediction of financial distress for public firms using logit regression. All these studies conclude that several financial ratios are significant measures in the prediction of financial distress and bankruptcy.

This thesis might be regarded as a continuation of the aforementioned studies since the purpose of this study is to provide evidence that financial ratios can be used in the prediction model of corporate financial distress. Unlike similar studies, however, this study attempts to extend the aforementioned studies further by including firm size as a control variable. Firm size is included with the purpose to find out if firm size influences the significance of financial distress prediction using financial ratios. In order to figure out if firm size really affects the significance of financial distress prediction, the sample firms will be classified into large and small.

The underlying reasons that inspire the inclusion of firm size as a control variable in this study derived from finance theories by Fama and French as well as other evidences of the presence of correlation between firm size and the performance of the firm. As proposed by Fama and French, firm size is an influential factor that determines stock returns since small firms tend to perform better than larger firms and hence yield higher returns compared to large firms (Butler 2004). Hence firm size creates the famous size effect. Several research findings mention that there is a correlation between firm size and profit, firm size and wage, and many more. In general, the research findings show that firm size affects firms' financial performance. Financial ratios reflect financial performance to some extent. Hence it triggers a question if firm size affects the result of prediction of financial distress using financial ratios. For instance, if small firms make higher profitability compared to large firms, then firm size might, in turn, affect the accuracy of the use of financial ratios in the prediction model of

financial distress. If firm size affects the accuracy of the prediction of financial distress, it will also affect the level of significance of the prediction.

This thesis takes firms in real estate and property sector as sample. Today several firms in this industry sector claim losses due to their poor performances. The low profitability is a result of the long-run impact of monetary crisis in 1998 when a lot of firms in real estate and property sector shut down. This showing that this industry sector endured the worst impact of monetary crisis. Despite of the fact that real estate and property sector showed a slow recovery in 2003, some firms are still staggering until now. Hence data sample comprises of firms in this industry sector will be appropriate to use in this study.

1. Problem Statement

   The problems are formulated as follows:

   a. Is there a difference between financial ratios at large and small non-distress and distress firms?
   b. Are financial ratios significant measures to predict financial distress of large and small firms?

B. Research Objective

1. Objective

   The research objectives are stated below:

   a. To analyze the influence of firm size towards the significance of the use of financial ratios to predict financial distress of small and large firms.

b. To figure out if financial ratios can be used to predict corporate financial distress of small and large firms.

2. Benefit

This research provides the following benefits:

a. Academic

As each research has limitations, scholars can conduct further research on aspects which have not been covered yet in this research.

b. Management

The result of this research will give some overview to managers related to the use of financial ratios in predicting financial distress. The utilization of this prediction model will help predict the likelihood of the firm's financial distress and let managers take preventive and corrective actions to remedy the financial condition before financial distress occurs.

c. Investor

This research may provide useful insight to prospective investors about how to analyze the performance of the firms at which they are interested to invest. By observing some patterns and behaviors of the firms' financial ratios, they can predict the likelihood of the firms to experience financial distress and make investment decision accordingly.

d. Creditor

By understanding how financial ratios serve as predictors of corporate financial distress, creditors can predict the likelihood that financial distress will occur at firms to which they will provide loans, and the prediction will

help creditors in deciding which firms should be given loans and assessing the firms' ability to repay the loans.

e. Auditor

The knowledge of the use of financial ratios as predictors of financial distress will help auditor to investigate the going concern of a company.

f. Government

The government may use the prediction model to investigate the firms' performance before making new regulations for a particular industry sector or deciding upon specific actions towards firms.

C. Thesis Framework

The thesis consists of five chapters. Chapter 1 presents an introduction and overview of the background of this research, research objectives and benefits. Chapter 2 contains literature review in which several theories and results of empirical researches are reviewed in order to give a theoretical background to the research. Chapter 3 presents the research methodology. The details of research findings and analysis will be explained in Chapter 4. Finally, conclusions and suggestions will be presented in Chapter 5.

CHAPTER II

LITERATURE REVIEW

A. Financial Distress

According to Platt and Platt (2002), financial distress is a phase in which financial state declines and this happens before bankruptcy and liquidation. Ross and Jaffe (2002) define financial distress as a condition in which "a firm's operating cash flows are insufficient to satisfy current obligations (such as trade credits or interest expenses), and then the firm is forced to take corrective action". Foster (1986) describes financial distress as "severe liquidity problems which cannot be resolved without a sizeable rescaling of the entity's operations or structure". According to Whitaker (1999), a firm is experiencing financial distress if the firm's net income is negative for several consecutive years. In this study, the last definition of financial distress by Whitaker will be used in identifying sample firms which are in financial distress since it offers clear-cut measure that distinguishes the financial condition of the firms.

Foster (1986) proposes several analysis which serve as information sources of indicators of financial distress:

1. Cash flow analysis

   Cash flow analysis provides information which focuses on "financial distress notion for the period of interest".

2. Corporate strategy analysis

   "This analysis considers the potential competitors of the firm or institution, its relative cost structure, plant expansions in the industry, the ability of firms to pass along cost increases, the quality of management, and so on." The result of this analysis may provide insight about the likelihood that financial distress will occur.

3. Financial statement analysis

   Financial statement analysis provides a lot of useful figures that show the performance of the firm. Financial statement is a crucial source of numerical data serving as financial measures in the prediction model of financial distress.

4. External variables

   External variables include "security returns and bond ratings" and they can "encode information about future cash flow and corporate strategy and information from the financial statements of the firm or institution".

B. Financial Statement

Financial statements include balance sheet, income statement, statement of retained earnings, and statement of cash flows. Balance sheet shows the financial position of the company. Income statement "reflects performance over a period of time". Statement of retained earnings shows the amount of firm's income retained rather than paid out as dividend. Statement of cash flows present a summary of "the changes in a company's cash position" resulted from operating, investing, and financing activities.

Brigham and Daves (2004) mention that "these statements give an accounting picture of the firm's operations and financial position", and "the financial statements report *what has actually happened* to assets, earnings, and dividends over the past few years". Financial statements are parts of annual report published by firms. As mentioned in Brigham and Daves (2004), "in any event, *the information contained in an annual report is used by investors to help form expectations about future earnings and dividends*". The annual report is not only useful to investors but also to management, shareholders, employees, government, customers and so on.

C. Financial Ratio

According to Brigham and Daves (2004), financial ratios will be useful "to help evaluate financial statements". There are six groups of financial ratios:

1. Liquidity ratios

   Liquidity ratios are used to measure the liquidity of the firms and thus show the ability of the firm to meet its short-term obligations. There are two liquidity ratios:

   a. $$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

   b. $$\text{Quick (acid test) ratio} = \frac{\text{Current assets - Inventories}}{\text{Current liabilities}}$$

2. Asset management ratios

   Asset management ratios show "how effectively the firm is managing its assets".

   a. Inventory turnover ratio $= \dfrac{\text{Sales}}{\text{Inventories}}$

   b. Days sales outstanding (DSO) $= \dfrac{\text{Receivables}}{\text{Average sales per day}}$

   c. Fixed asset turnover ratio $= \dfrac{\text{Sales}}{\text{Net fixed assets}}$

   d. Total assets turnover ratio $= \dfrac{\text{Sales}}{\text{Total assets}}$

3. Debt management ratios

   The ratios show the firm's ability to manage debt.

   a. Debt ratio $= \dfrac{\text{Total liabilities}}{\text{Total assets}}$

   b. Times-interest-earned (TIE) ratio $= \dfrac{\text{EBIT}}{\text{Interest charges}}$

   c. EBITDA coverage ratio $= \dfrac{\text{EBITDA} + \text{Lease payments}}{\text{Interest} + \text{Principal payments} + \text{Lease Payments}}$

4. Profitability ratios

   These ratios show "the combined effects of liquidity, asset management, and debt on operating results.

   a. Profit margin on sales $= \dfrac{\text{Net income}}{\text{Sales}}$

   b. Basic Earning Power (BEP) $= \dfrac{\text{EBIT}}{\text{Total assets}}$

c. Return on total assets (ROA) $= \frac{\text{Net income}}{\text{Total assets}}$

d. Return on common equity (ROE) $= \frac{\text{Net income}}{\text{Total assets}}$

5. Market value ratios

These ratios show "what investors think of the company's past performance and future prospects".

a. Price/Earnings ratio $= \frac{\text{Price per share}}{\text{Earnings per share}}$

b. Price/cash flow $= \frac{\text{Price per share}}{\text{Cash flow per share}}$

c. Book value per share $= \frac{\text{Common equity}}{\text{Shares outstanding}}$

d. Market/book ratio = M/B $= \frac{\text{Market price per share}}{\text{Book value per share}}$

Financial ratios derived from data found in financial statements. In line with the functions of financial statement analysis, prediction of financial distress is done through analysis of financial ratios (Wild et al., 2003).

> Models of financial distress, commonly referred to as bankruptcy prediction models, examine the trend and behavior of selected ratios. Characteristics of these ratios are used in identifying the likelihood of future financial distress. Models presume that evidence of distress appears in financial ratios and that we can detect it sufficiently early for us to take actions to either avoid risk of loss or to capitalize on this information.

Thus it is evident that financial ratios can serve as predictors of corporate financial distress.

D. The Use of Financial Ratio Analysis in Prediction of Financial Distress

Financial ratio analysis is a popular financial analysis as it provides several benefits. In general, financial ratio analysis is used to measure the financial performance of the firm. Specifically, financial ratio analysis is used in prediction of corporate financial distress and bankruptcy. As quoted in Konings and Roodhooft (1997), Barner proposes positive and normative applications of financial ratios. Positive applications refer to "estimation of empirical relationships" (e.g. bankruptcy prediction) while normative applications include assessing a firm's performance by benchmarking a firm's financial ratios with those of industry leader.

The use of financial ratios as predictors of corporate financial distress has been a very attractive topic to researchers. Financial ratios were used traditionally in combination with various statistical techniques classified into univariate and multivariate analysis. Univariate analysis refers to finding the most significant financial ratio as a single predictor of financial distress while multivariate analysis involves more complex techniques like single or multiple discriminant analysis (MDA), artificial neural network (ANN), and logistic regression (logit, probit, and tobit). Among the most prominent researchers are Beaver (1960s), Altman (1968), Deakin (1972), Altman, Haldeman and Narayanan (1977), Hall and Byron (1992), Tan and Dihardjo (1997), Almilia and Kristijadi (2003), Almilia and Herdiningtyas (2005), and Almilia (2006).

Beaver's work in the late 1960's has pioneered the development of this prediction model by introducing his univariate analysis of bankruptcy prediction.

"Beaver found that a number of indicators could discriminate between matched samples of failed and non-failed firms for as long as five years prior to failure" (Heine, 2000). Beaver concluded that cash flow to debt ratio was the most significant predictor (Chuvakhin and Gertmenian, 2003). Apparently, Beaver questioned the usefulness of multivariate analysis in such prediction as univariate analysis was deemed sufficient.

Extending this matter to a further development, in 1968 Altman developed his Z-Score based on multivariate analysis. While Altman initially developed the Z-Score for the purpose of bankruptcy prediction, Z-Score was also widely used in financial distress prediction. The Z-score model employs five financial ratios which represent liquidity, age of firm and cumulative profitability, profitability, financial structure, and capital turnover rate. The function is as follows:

$$Z = 0.717\ X_1 + 0.847\ X_2 + 3.107\ X_3 + 0.420\ X_4 + 0.998\ X_5$$

where X1 to X5 denote the value of the following ratios:

X_1 = working capital/total assets

X_2 = retained earnings/total assets

X_3 = earnings before interest and taxes/total assets

X_4 = equity/total liabilities

X_5 = sales/total assets

"A Z-score of less than 1.20 suggests a high probability of bankruptcy, while Z-scores above 2.90 imply a low probability of bankruptcy. Scores between 1.20 and 2.90 are in the gray or ambiguous area" (Wild et al., 2003). Altman selected a sample of 33 public manufacturing firms which went bankrupt between 1946 and

1965 and "matched them to 33 firms on a random basis for a stratified sample (assets and industry)" (Chuvakin and Gertmenian, 2003). Altman's Z-score showed very high level of accuracy in classifying the bankrupt and non-bankrupt firms one year before bankruptcy. However, the level of accuracy decreased when Z-Score was used to predict bankruptcy more than one year before it occurred. The Z-score model has been extended to include private firms (Chuvakin and Gertmenian, 2003).

In contrast with Beaver's univariate analysis, subsequent studies widely employed multivariate technique in the analysis of financial distress and bankruptcy prediction. "Deakin (1972) utilized the same 14 variables that Beaver analyzed, but he applied them within a series of multivariate discriminant models (Heine 2000). Beaver's and Deakin's studies showed that financial ratios as potential predictors of bankruptcy. The most significant indicators include profitability, liquidity, and solvency ratios (Heine 2000).

The emergence of multivariate analysis in the prediction of financial distress and bankruptcy using financial ratio analysis was triggered by the limitation of using univariate analysis in such area. "Ratio analysis presented in this fashion is susceptible to faulty interpretation and is potentially confusing" (Heine, 2000). Univariate analysis denotes that financial ratios are analyzed individually. The problem is apparent when one ratio reflects the poor performance of the firm while another ratio shows the opposite. The conflicting results make it difficult to conclude whether or not the firm is exposed to financial

distress or bankruptcy. Hence the application of univariate analysis alone in such study may lead to ambiguity.

In 1977, Altman, Haldeman and Narayanan developed a new generation of the Z-score model and the revised model is named ZETA model. This model is deemed to be "effective in classifying bankrupt companies up to five years prior to failure on a sample of corporations consisting of manufacturers and retailers" (Altman et al., 1977). One of the reason which triggered the development of ZETA model was that new factors like firm size and financial profile of business failures have gained an increasing concern since the average size of bankrupt firms had increased dramatically. Hence ZETA model is expected to be more relevant to the sample population.

In 1992, Hall and Byron used "probit model with thirteen basic financial ratios to predict financial distress among credit unions in New South Wales. Of the thirteen ratios, four were found to make a significant contribution to predicting financial distress" (Tan and Dihardjo, 2001). The ratios were Required Doubtful Debt Provision, Permanent Share Capital + Reserves + Over provision for Doubtful Debt to Total Assets, Operating Surplus to Total Assets, and Operating Expenses to Total Assets.

In 1997 Tan attempted to investigate the use of artificial neural network (ANN) in analysis of financial distress. develop an early warning predictor of credit union financial distress. Tan and Dihardjo (2001) then compared the use of ANN model with probit model used by Hall and Byron in 1992. To ensure fair comparison between the two models, Tan and Dihardjo (2001) used the same data

as Hall and Byron in 1992. The first impression was that both models have equal level of accuracy. However, in some cases ANN proved to be able to provide early warning signals of financial distress earlier than probit model.

In 2003, Almilia and Kristijadi conducted a research to study the use of financial ratios to predict financial distress of manufacturing firms listed at Jakarta Stock Exchange. This study concluded that several financial ratios can be used to predict corporate financial distress. The ratios were profit margin ratio (net income/net sales), financial leverage ratio (current liabilities/total assets), liquidity ratio (current assets/current liabilities) and growth (net income/total assets growth).

This research was followed by another research with similar topic but different sample firms. In 2005 Almilia and Herdiningtyas analyzed the use of CAMEL ratios in the bankruptcy and financial distress prediction of banks in Indonesia. CAMEL ratios are financial ratios specifically used in analyzing the performance of banking firms. Almilia and Herdiningtyas (2005) took sample of 16 banks which did not go bankrupt until 2000, 2 banks which went bankrupt, and 6 banks in financial distress. The result of this study showed that CAMEL ratios are significant predictors of bankruptcy and financial distress.

The latest work by Almilia in 2006 was a research on prediction of financial distress for public firms using logit regression. The sample firms consisted of firms listed at Indonesia Stock Exchange. The purpose of this study was to prove that financial ratios derived from balance sheet, statement of income and statement of cash flow can be used in the prediction of financial distress. The

result of this study showed that those financial ratios are significant measures in the prediction of financial distress.

E. Size Effect

Fama and French proposed the concept of size effect as "a tendency for small firms in a national market to outperform large firms in that market" (Butler 2004). The implication of size effect is that "smaller firms tend to have higher mean returns than larger firms in both U.S and non-U.S markets" (Butler 2004). The various sizes of firm impose differences in many aspect, including operational and financial aspects. Large firms tend to utilize higher leverage than small firms, and theoretically they have smaller probability of default or bankrupt than small firms due to their large amount of assets to back up losses. Small firms are usually at growth stage while large firms are often at mature stage. The law of diminishing return mentions that as the scale of the entity goes up, the return of the entity will go down. Hence small firms yield higher return than large firms. On the contrary, some argue that large firms will, indeed, earn higher return than small firms because they have larger market share, larger amount of assets and better access to more advanced technologies. Small firms tend to be more adaptive to changes than large firms. These factors cause a variety of financial performances as reflected in the financial ratios. The differences might affect the accuracy and significance of the use of financial ratios to predict the firm's likelihood of financial distress. Due to the differences of firm sizes which, in turn, affect the capabilities of the firm in, for example, maneuvering when financial performance declines, the use of financial ratios might or might not have accuracy and

significance in predicting the firm's likelihood of financial distress when applied to firms with different sizes. This situation provides a chance to conduct research to investigate further the effect of firms size towards the accuracy and significance of financial distress prediction model using financial ratios.

The first problem in this study attempts to figure out whether financial ratios can be used to predict corporate financial distress. Financial ratios can be used as predictors of financial distress when there is a significant difference between financial ratios of distress and non distress firms. Hence the first hypothesis aims to prove whether the difference exists. The first hypothesis is formulated in the form of alternate hypothesis as follows:

H_1: There is a difference between financial ratios at small and large distress and non-distress firms.

Since firm size is included as a factor of investigation, the cross-section technique will be used in testing the first hypothesis. Hence there will be four results of comparison.

The first hypothesis testing implies a possibility that if null hypothesis is accepted, the second hypothesis testing will not be performed. However, the first hypothesis testing must be performed in order to prove whether or not the financial ratios of non-distress firms differ from the financial ratios of distress firms. If the difference exists, it indicates that financial ratios can be used to predict financial distress. Furthermore, the result of the first hypothesis testing will show which financial ratios are going to be put into logistic regression.

The theories above also support the second hypothesis in this study. The second hypothesis is formulated in the form of alternate hypothesis as follows:

H_2: Financial ratios are significant measures to predict financial distress of large and small firms.

The second hypothesis will be tested using logistic regression, and here the influence of size effect will be examined by testing the significance of coefficients in the logistic regression model for large firms and small firms. The coefficient values show how significant the ratios affect the prediction of financial distress and the coefficient signs show the way the ratios affect the prediction of financial distress.

CHAPTER III

RESEARCH METHODOLOGY

A. Sample

The sample comprises of 20 real estate and property firms listed at Jakarta Stock Exchange since 2003 to 2007. The sample firms are chosen with purposive sampling because the sample firms are firms which do not produce outlier values of financial ratio. The observation period extends from 2003 to 2007. The samples are divided into two categories: distress firms and non-distress firms. Firms in each category will then be divided into two groups based on firm size, namely large and small firms. Financial ratios of those two firm groups will be compared in order to figure out whether financial ratios can be used to predict financial distress.

B. Variable Definition

1. Independent Variable

   The independent variable includes four financial ratios.

   a. Profit Margin Ratio $= \dfrac{\text{Net Income}}{\text{Sales}}$

   b. Current Ratio $= \dfrac{\text{Current assets}}{\text{Current liabilities}}$

   c. Financial Leverage Ratio $= \dfrac{\text{Current liabilities}}{\text{Total assets}}$

   d. Net Income Growth Ratio $= \dfrac{\text{Net income growth}}{\text{Total assets}}$

2. Dependent Variable

   The dependent variable is the financial status of the sample firm, which is a categorical variable with two possible outcomes, namely 0 for non-distress firm and 1 for distress firm.

3. Control Variable

   Firm size becomes a control variable in this research. The control variable is a categorical variable with two possible outcomes, namely 0 for large firm and 1 for small firm. The control variable will be put into test of difference as grouping variable. It will also be included in logistic regression and be treated as dependent variable.

C. Data Collection and Sources

The data are taken from financial data of sample firms in Indonesian Capital Market Directory starting from the year 2003 to 2006. Meanwhile, as Indonesia Capital Market Directory has not published the financial data for the year 2007, the data will be taken from JSX Watch 2008-2009 and soft copy of financial data taken from Indonesia Capital Market Directory 2008.

D. Research Procedures

The details of research procedures are as follows:

1. Data Analysis

   The sample firms are classified into two categories, namely distress and non-distress firms. The classification is based on the firms' net income for several

consecutive years. Based on net income figures provided in financial statements for the year 2006 and 2007, firms with negative net income for several consecutive years will be classified as distress firms. The sample firms in each category will then be grouped into large and small firms. The classification is based on the firms' rank obtained by comparison of market capitalization. The profit margin ratio, current ratio, financial leverage ratio, and net income growth ratio of the sample firms are arranged into cross-sectional data.

2. Normality Test

   Before testing the first hypothesis, normality test must be performed in order to figure out whether or not the data follow normal distribution. Normality test will be performed using descriptive statistics and histogram. The result of the test will determine if the first hypothesis will be tested using parametric or nonparametric statistical test.

3. Test of Difference

   The test of difference is needed in order to make decision whether or not to reject null hypothesis in the first hypothesis. There will be two stages of test of difference for each ratio:

   a. Financial ratios of non-distress firms will be compared with financial ratios of distress firms without being grouped based on firm size.

      The first stage of test of difference will show whether or not the financial ratios of non-distress firms differ from the financial ratios of distress firms, without the influence of size effect.

b. Financial ratios of non-distress firms will be compared with financial ratios of distress firms while being grouped based on firm size.

The second stage of test of difference will show whether or not the financial ratios of non-distress firms differ from the financial ratios of distress firms with the influence of size effect. There will be four pairs of comparison in this stage:

a) Financial ratios of large, non-distress firms will be compared with financial ratios of large, distress firms.
b) Financial ratios of small, non-distress firms will be compared with financial ratios of small, distress firms.
c) Financial ratios of large, non-distress firms will be compared with financial ratios of small, non-distress firms.
d) Financial ratios of large, distress firms will be compared with financial ratios of small, distress firms.

There are two possible tests of difference, namely t-test and Mann-Whitney U test. One of them will be chosen depending on whether or not the data follow normal distribution.

a) t-test

The t-test is a parametric test used in testing the difference between the sample means of two independent samples. If the data distribution is normal, t-test will be used in the test of difference with the sign significance level (α) of 0.05. If the p-value (2-tailed) is smaller than the significance level (α), the null hypothesis is rejected..

b) Mann-Whitney U Test

Mann-Whitney U test is a non-parametric used in testing the difference between the sample means of two independent samples. If the data distribution is not normal, Mann-Whitney U for two independent samples will be used in the test the difference, with the significance level (α) of 0.05. If the p-value (2-tailed) is smaller than the significance level (α), the null hypothesis is rejected.

The result of the test of difference will show which financial ratios have statistical difference between the sample groups. These financial ratios then will be put into logistic regression.

4. Test of Assumptions Required for Binary Logistic Regression

Unlike linear regression, binary logistic regression does not assume normality, autocorrelation and heteroscedasticity (Garson 2008). Binary logistic regression, however, requires several other assumptions:

a. Dichotomous Dependent Variable

The dependent variable is assumed to be dichotomous for binary logistic regression. Meanwhile, the independent variables are not necessarily dichotomous (Garson 2008).

b. Meaningful Coding

The dependent variable must be coded meaningfully into 0 and 1, with the group of greatest interest be coded as 1 and the other group as 0 (Garson 2008).

c. Independent Sampling

The data must be independent, since binary logistic regression cannot handle correlated samples and data with repeated measures, such as before-after or matched-pairs data, cluster sampling, or time-series data (Garson 2008).

d. No multicollinearity

Multicollinearity indicates the presence of correlation among the independent variables. The presence of multicollinearity leads to unreliable estimation of regression coefficients (Garson 2008). Multicollinearity can be detected using Variance Inflation Factor (VIF) test (Nugroho 2005). The data are not infected by multicollinearity if the VIF value is less than 10 (Nugroho 2005). If multicollinearity is found, it has to be removed before proceeding to regression analysis.

e. No outliers

Any outlier of standardized residuals must be removed before performing binary logistic regression. Hence the value of standardized residual must be obtained and be checked for outliers. Using the significance level of 0.01, the standardized residuals > 2.58 are considered as outliers (Garson 2008).

f. Adequate sample size

The smallest sample size allowed in binary logistic regression is 10 cases (Garson 2008).

5. Binary Logistic Regression

The second hypothesis will be tested using binary logistic regression Binary logistic regression is used to test the classification power and significance of financial ratios as predictors of financial distress for sample firms which are classified into large and small firms. It measures the likelihood of the probability that the occurrence of dependent variable can be predicted with the independent variables.

CHAPTER IV

RESEARCH FINDINGS AND ANALYSIS

Chapter IV is divided into several parts based the tests performed. The sections are normality test and test of difference. The normality test consist of two parts, namely descriptive statistics and histogram. The test of difference is divided into two parts. The first part contains test of difference between non-distress and distress groups. The second part contains test of difference between non-distress and distress group with the inclusion of firm size as control variable.

A. Normality Test

Normality test is performed through analyzing descriptive statistics and observing histogram.

1. Descriptive Statistics

Table 1. Descriptive Statistics

Descriptive Statistics

	N	Range	Minimum	Maximum	Sum	Mean	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
Profit Margin Ratio	20	1.01	-.29	.72	2.52	.1260	.05029
Current Ratio	20	1.70	.09	1.79	16.34	.8170	.10527
Financial Leverage Ratio	20	.80	.21	1.01	9.62	.4810	.04800
Net Income Growth Ratio	20	.04	-.02	.02	-.01	-.0005	.00303
Valid N (listwise)	20						

Source : SPSS Output

Central Limit Theorem states that if sample size is at least 30, the data will follow normal distribution. As stated in the table, the sample size (N) = 20. In this case, it is most likely that the data do not follow normal distribution. Range shows the difference between the smallest and the largest data value. Minimum statistic and maximum statistic show the lowest and highest data value respectively. The sum statistic shows the sum of all data values for each variable. The mean shows the average values of data.

Table 2. Normality Test

Descriptive Statistics

	Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Profit Margin Ratio	.22491	.051	.932	.512	2.221	.992
Current Ratio	.47079	.222	.493	.512	-.313	.992
Financial Leverage Ratio	.21467	.046	.735	.512	.200	.992
Net Income Growth Ratio	.01356	.000	.240	.512	-.966	.992
Valid N (listwise)						

Source : SPSS Output

Standard deviation shows the spread of data, while variance statistic measures variability of data. Small standard deviation means that the data are closely clustered around the mean, making the data measurement more reliable. Skewness measures the symmetry of data values and its direction. Normal distribution has a skewness of 0. The value of skewness for each variable is

not very close to zero. Hence it is safe to assume that the data distribution is not normal. Kurtosis shows the height of the bell shape curve, but it does not affect the analysis of normal distribution.

2. Histogram

Histogram portrays the frequency distribution of data. Data that follow normal distribution will closely fit to the bell-shape curve on the histogram.

a. Profit Margin Ratio

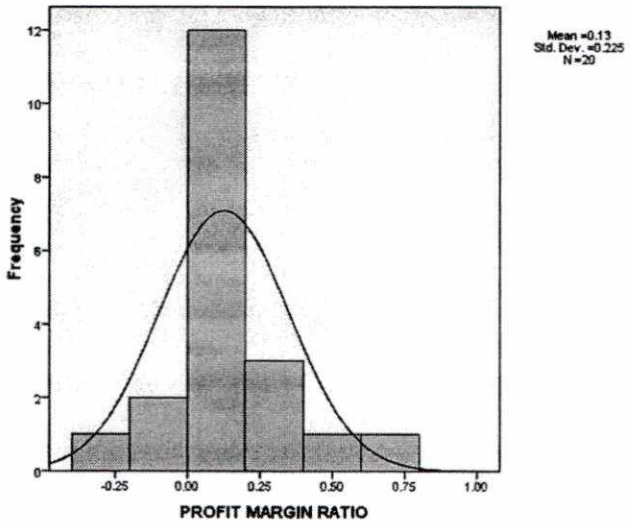

Chart 1. Profit Margin Ratio

Among the four histograms, the histogram of profit margin ratio shows the closest fit to bell-shape, indicating that the data of profit margin ratio follow normal distribution.

b. Current Ratio

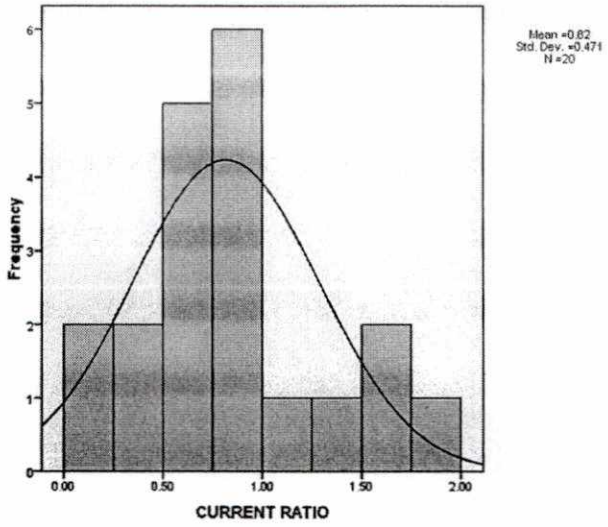

Chart 2. Current Ratio

The histogram of current ratio does not fit the bell-shape curve as normal distribution curve. Hence the data of current ratio do not follow normal distribution.

c. Financial Leverage Ratio

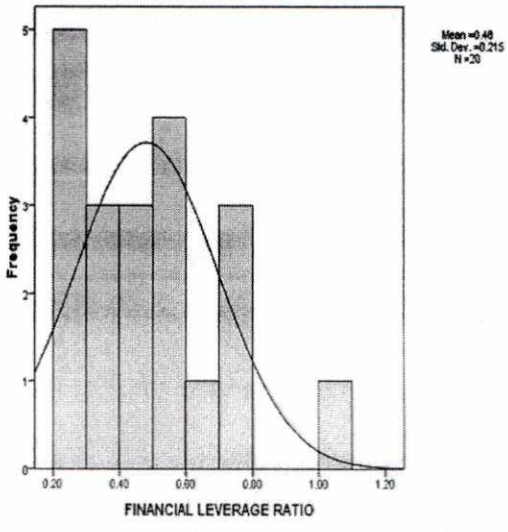

Chart 3. Financial Leverage Ratio

The histogram of financial leverage ratio does not fit the bell-shape curve as normal distribution curve. Hence the data of current ratio do not follow normal distribution.

d. Net Income Growth Ratio

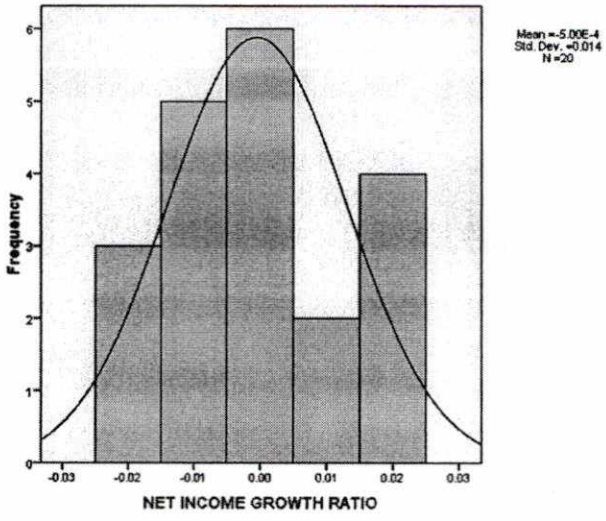

Chart 4. Net Income Growth Ratio

The histogram of net income growth ratio does not fit the bell-shape curve as normal distribution curve. Hence the data of current ratio do not follow normal distribution.

Both descriptive statistics and histogram show that the data do not follow normal distribution. Since normality assumption for parametric test is not fulfilled, it is most appropriate to conduct the test of difference using non-parametric test.

B. Test of Difference

Mann-Whitney U test is chosen in the test of difference. As stated in chapter II, there are two stages of comparison. The first stage of comparison compares the

data between non-distress and distress group(s) for each ratio. The second stage of comparison compares four groups of data, namely large, non-distress firms, large, distress firms, small, non-distress firms, and small, distress firms. In the latter stage of comparison, there are four pairs of comparison for each ratio. The result is as follows:

1. Test of difference between non-distress and distress group of data
   a. Profit Margin Ratio

Table 3. Mann-Whitney U test statistics for Profit Margin Ratio, non-distress firm to distress firm

Test Statistics[b]

	PROFIT MARGIN RATIO
Mann-Whitney U	17.000
Wilcoxon W	20.000
Z	-.126
Asymp. Sig. (2-tailed)	.899
Exact Sig. [2*(1-tailed Sig.)]	.947[a]

a. Not corrected for ties.

b. Grouping Variable: FINANCIAL DISTRESS

Source: SPSS Output

Table 3 shows the result of Mann-Whitney U test for testing the difference between profit margin ratio of non-distress and distress firms. The asymptotic significance (2-tailed) value of 0.899 is larger than the significance level of 0.05, so H_0 is not rejected. It shows a strong evidence

that there is no difference between profit margin ratio of non-distress firm and distress firm. This result is contradictory to the result of Almilia and Kristijadi's research in 2003 which concludes that there is statistical difference between profit margin ratio of non-distress firm and distress firm.

b. Current Ratio

Table 4. Mann-Whitney U test statistics for Current Ratio, non-distress firm to distress firm

Test Statistics[b]

	CURRENT RATIO
Mann-Whitney U	14.000
Wilcoxon W	17.000
Z	-.504
Asymp. Sig. (2-tailed)	.614
Exact Sig. [2*(1-tailed Sig.)]	.674[a]

a. Not corrected for ties.

b. Grouping Variable: FINANCIAL DISTRESS

Source: SPSS Output

Table 4 shows the result of Mann-Whitney U test for testing the difference between current ratio of non-distress and distress firms. The asymptotic significance (2-tailed) value of 0.614 is larger than the significance level of 0.05, so H_0 is not rejected. It shows a strong evidence that there is no difference between current ratio of non-distress firm and distress firm.

This result is contradictory to the result of Almilia and Kristijadi's research in 2003 which concludes that there is statistical difference between current ratio of non-distress firm and distress firm.

c. Financial Leverage Ratio

Table 5. Mann-Whitney U test statistics for Financial Leverage Ratio, non-distress firm to distress firm

Test Statistics[b]

	FINANCIAL LEVERAGE RATIO
Mann-Whitney U	13.500
Wilcoxon W	16.500
Z	-.567
Asymp. Sig. (2-tailed)	.571
Exact Sig. [2*(1-tailed Sig.)]	.589[a]

a. Not corrected for ties.

b. Grouping Variable: FINANCIAL DISTRESS

Source: SPSS Output

Table 5 shows the result of Mann-Whitney U test for testing the difference between financial leverage ratio of non-distress and distress firms. The asymptotic significance (2-tailed) value of 0.571 is larger than the significance level of 0.05, so H_0 is not rejected. It shows a strong evidence that there is no difference between financial leverage ratio of non-distress firm and distress firm. This result is contradictory to the result of Almilia

and Kristijadi's research in 2003 which concludes that there is statistical difference between financial leverage ratio of non-distress firm and distress firm.

d. Net Income Growth Ratio

Table 6. Mann-Whitney U test statistics for Net Income Growth Ratio, non-distress firm to distress firm

Test Statistics[b]

	NET INCOME GROWTH RATIO
Mann-Whitney U	17.500
Wilcoxon W	20.500
Z	-.065
Asymp. Sig. (2-tailed)	.948
Exact Sig. [2*(1-tailed Sig.)]	.947[a]

a. Not corrected for ties.

b. Grouping Variable: FINANCIAL DISTRESS

Source: SPSS Output

Table 6 shows the result of Mann-Whitney U test for testing the difference between net income growth ratio of non-distress and distress firms. The asymptotic significance (2-tailed) of 0.948 is larger than the significance level of 0.05, so H_0 is not rejected. It shows a strong evidence that there is no difference between net income growth ratio of non-distress firm and distress firm. This result is contradictory to the result of Almilia and Kristijadi's research in 2003 which concludes that there is statistical

difference between net income growth ratio of non-distress firm and distress firm.

2. Test of difference between non-distress and distress group of data with the inclusion of firm size

   a. Profit Margin Ratio

      1) Large, non-distress firm compared to large, distress firm

Table 7. Mann-Whitney U test statistics for Profit Margin Ratio, large, non-distress firm to large, distress firm

Test Statistics[b]

	PROFIT MARGIN RATIO, LARGE FIRM
Mann-Whitney U	1.000
Wilcoxon W	46.000
Z	-1.226
Asymp. Sig. (2-tailed)	.220
Exact Sig. [2*(1-tailed Sig.)]	.400[a]

a. Not corrected for ties.

b. Grouping Variable: FINANCIAL DISTRESS

Source: SPSS Output

Table 7 shows the result of Mann-Whitney U test for testing the difference of profit margin ratio between large, non-distress firm and large, distress firm. The asymptotic significance (2-tailed) value of 0.220 is larger than the significance level of 0.05, so H_0 is not rejected.

It shows a strong evidence that there is no difference between the profit margin ratio of non-distress firm and distress firm in large firm group.

2) Small, non-distress firm compared to small, distress firm

Table 8. Mann-Whitney U test result for Profit Margin Ratio, small, non-distress firm to small, distress firm

Test Statistics[b]

	PROFIT MARGIN RATIO, SMALL FIRM
Mann-Whitney U	.000
Wilcoxon W	1.000
Z	-1.576
Asymp. Sig. (2-tailed)	.115
Exact Sig. [2*(1-tailed Sig.)]	.200[a]

a. Not corrected for ties.

b. Grouping Variable: FINANCIAL DISTRESS

Source: SPSS Output

Table 8 shows the result of Mann-Whitney U test for testing the difference of profit margin ratio between small, non-distress firm and small, distress firm. The asymptotic significance (2-tailed) value of 0.115 is larger than the significance level of 0.05, so H_0 is not rejected. It shows a strong evidence that there is no difference between profit margin ratio of non-distress firm and distress firm in small firm group.

3) Large, non-distress firm to small, non-distress firm

Table 9. Mann-Whitney U test result for Profit Margin Ratio, large, non-distress firm to small, non-distress firm

Test Statistics[b]

	PROFIT MARGIN RATIO, NON-DISTRESS
Mann-Whitney U	17.000
Wilcoxon W	62.000
Z	-2.083
Asymp. Sig. (2-tailed)	.037
Exact Sig. [2*(1-tailed Sig.)]	.040[a]

a. Not corrected for ties.

b. Grouping Variable: FIRM SIZE

Source: SPSS Output

Table 9 shows the result of Mann-Whitney U test for testing the difference of profit margin ratio between large, non-distress firm and small, non-distress firm. The asymptotic significance (2-tailed) value of 0.037 is larger than the significance level of 0.05, so H_0 is rejected. It shows a strong evidence that there is a difference between profit margin ratio of large, non-distress firm and small, non-distress firm.

4) Large, distress firm compared to small, distress firm

Table 10. Mann-Whitney U test result for Profit Margin Ratio, large, distress firm to small, distress firm

Test Statistics[b]

	PROFIT MARGIN RATIO, DISTRESS
Mann-Whitney U	.000
Wilcoxon W	1.000
Z	-1.000
Asymp. Sig. (2-tailed)	.317
Exact Sig. [2*(1-tailed Sig.)]	1.000[a]

a. Not corrected for ties.

b. Grouping Variable: FIRM SIZE

Source: SPSS Output

Table 10 shows the result of Mann-Whitney U test for testing the difference of profit margin ratio between large, distress firm and small, distress firm. The asymptotic significance (2-tailed) value of 0.317 is larger than the significance level of 0.05, so H_0 is not rejected. It shows a strong evidence that there is no difference between profit margin ratio of large, distress firm and small, distress firm.

b. Current Ratio

1) Large, non-distress firm compared to large, distress firm

Table 11. Mann-Whitney U test statistics for Current Ratio, large, non-distress firm to large, distress firm

Test Statistics[b]

	CURRENT RATIO, LARGE FIRM
Mann-Whitney U	3.000
Wilcoxon W	48.000
Z	-.524
Asymp. Sig. (2-tailed)	.600
Exact Sig. [2*(1-tailed Sig.)]	.800[a]

a. Not corrected for ties.

b. Grouping Variable: FINANCIAL DISTRESS

Source: SPSS Output

Table 11 shows the result of Mann-Whitney U test for testing the difference of current ratio between large, non-distress firm and large, distress firm. The asymptotic significance (2-tailed) value of 0.600 is larger than the significance level of 0.05, so H_0 is not rejected. It shows a strong evidence that there is no difference between current ratio of non-distress firm and distress firm in large firm group.

2) Small, non-distress firm compared to small, distress firm

Table 12. Mann-Whitney U test result for Current Ratio, small, non-distress firm to small, distress firm

Test Statistics[b]

	CURRENT RATIO, SMALL FIRM
Mann-Whitney U	2.000
Wilcoxon W	3.000
Z	-.870
Asymp. Sig. (2-tailed)	.384
Exact Sig. [2*(1-tailed Sig.)]	.600[a]

a. Not corrected for ties.

b. Grouping Variable: FINANCIAL DISTRESS

Source: SPSS Output

Table 12 shows the result of Mann-Whitney U test for testing the difference of current ratio between small, non-distress firm and small, distress firm. The asymptotic significance (2-tailed) value of 0.384 is larger than the significance level of 0.05, so H_0 is not rejected. It shows a strong evidence that there is no difference between current ratio of non-distress firm and distress firm in small firm group.

3) Large, non-distress firm to small, non-distress firm

Table 13. Mann-Whitney U test result for Current Ratio, large, non-distress firm to small, non-distress firm

Test Statistics[b]

	CURRENT RATIO, NON-DISTRESS
Mann-Whitney U	39.500
Wilcoxon W	84.500
Z	-.088
Asymp. Sig. (2-tailed)	.930
Exact Sig. [2*(1-tailed Sig.)]	.931[a]

a. Not corrected for ties.

b. Grouping Variable: FIRM SIZE

Source: SPSS Output

Table 13 shows the result of Mann-Whitney U test for testing the difference of current ratio between large, non-distress firm and small, non-distress firm. The asymptotic significance (2-tailed) value of 0.930 is larger than the significance level of 0.05, so H_0 is not rejected. It shows a strong evidence that there is no difference between current ratio of large, non-distress firm and small, non-distress firm.

4) Large, distress firm compared to small, distress firm

Table 14. Mann-Whitney U test result for Current Ratio, large, distress firm to small, distress firm

Test Statistics[b]

	CURRENT RATIO, DISTRESS
Mann-Whitney U	.000
Wilcoxon W	1.000
Z	-1.000
Asymp. Sig. (2-tailed)	.317
Exact Sig. [2*(1-tailed Sig.)]	1.000[a]

a. Not corrected for ties.

b. Grouping Variable: FIRM SIZE

Source: SPSS Output

Table 14 shows the result of Mann-Whitney U test for testing the difference of current ratio between large, distress firm and small, distress firm. The asymptotic significance (2-tailed) value of 0.317 is larger than the significance level of 0.05, so H_0 is not rejected. It shows a strong evidence that there is no difference between current ratio of large, distress firm and small, distress firm.

c. Financial Leverage Ratio

1) Large, non-distress firm compared to large, distress firm

Table 15. Mann-Whitney U test statistics for Financial Leverage Ratio, large, non-distress firm to large, distress firm

Test Statistics[b]

	FINANCIAL LEVERAGE RATIO, LARGE FIRM
Mann-Whitney U	3.500
Wilcoxon W	4.500
Z	-.349
Asymp. Sig. (2-tailed)	.727
Exact Sig. [2*(1-tailed Sig.)]	.800[a]

a. Not corrected for ties.

b. Grouping Variable: FINANCIAL DISTRESS

Source: SPSS Output

Table 15 shows the result of Mann-Whitney U test for testing the difference of financial leverage ratio between large, non-distress firm and large, distress firm. The asymptotic significance (2-tailed) value of 0.727 is larger than the significance level of 0.05, so H_0 is not rejected. It shows a strong evidence that there is no difference between financial leverage ratio of non-distress firm and distress firm in large firm group.

2) Small, non-distress firm compared to small, distress firm

Table 16. Mann-Whitney U test result for Financial Leverage Ratio, small, non-distress firm to small, distress firm

Test Statistics[b]

	FINANCIAL LEVERAGE RATIO, SMALL FIRM
Mann-Whitney U	2.000
Wilcoxon W	3.000
Z	-.870
Asymp. Sig. (2-tailed)	.384
Exact Sig. [2*(1-tailed Sig.)]	.600[a]

a. Not corrected for ties.

b. Grouping Variable: FINANCIAL DISTRESS

Source: SPSS Output

Table 16 shows the result of Mann-Whitney U test for testing the difference of financial leverage ratio between small, non-distress firm and small, distress firm. The asymptotic significance (2-tailed) value of 0.384 is larger than the significance level of 0.05, so H_0 is not rejected. It shows a strong evidence that there is no difference between financial leverage ratio of non-distress firm and distress firm in small firm group.

3) Large, non-distress firm to small, non-distress firm

Table 17. Mann-Whitney U test result for Financial Leverage Ratio, large, non-distress firm to small, non-distress firm

Test Statistics[b]

	FINANCIAL LEVERAGE RATIO, NON-DISTRESS
Mann-Whitney U	28.000
Wilcoxon W	73.000
Z	-1.104
Asymp. Sig. (2-tailed)	.270
Exact Sig. [2*(1-tailed Sig.)]	.297[a]

a. Not corrected for ties.

b. Grouping Variable: FIRM SIZE

Source: SPSS Output

Table 17 shows the result of Mann-Whitney U test for testing the difference of financial leverage ratio between large, non-distress firm and small, non-distress firm. The asymptotic significance (2-tailed) value of 0.270 is larger than the significance level of 0.05, so H_0 is not rejected. It shows a strong evidence that there is no difference between financial leverage ratio of large, non-distress firm and small, non-distress firm.

4) Large, distress firm compared to small, distress firm

Table 18. Mann-Whitney U test result for Financial Leverage Ratio, large, distress firm to small, distress firm

Test Statistics[b]

	FINANCIAL LEVERAGE RATIO, DISTRESS
Mann-Whitney U	.000
Wilcoxon W	1.000
Z	-1.000
Asymp. Sig. (2-tailed)	.317
Exact Sig. [2*(1-tailed Sig.)]	1.000[a]

a. Not corrected for ties.

b. Grouping Variable: FIRM SIZE

Source: SPSS Output

Table 18 shows the result of Mann-Whitney U test for testing the difference of financial leverage ratio between large, distress firm and small, distress firm. The asymptotic significance (2-tailed) value of 0.317 is larger than the significance level of 0.05, so H_0 is not rejected. It shows a strong evidence that there is no difference between financial leverage ratio of large, distress firm and small, distress firm.

d. Net Income Growth

1) Large, non-distress firm compared to large, distress firm

Table 19. Mann-Whitney U test statistics for Net Income Growth Ratio, large, non-distress firm to large, distress firm

Test Statistics[b]

	NET INCOME GROWTH RATIO, LARGE FIRM
Mann-Whitney U	1.000
Wilcoxon W	2.000
Z	-1.257
Asymp. Sig. (2-tailed)	.209
Exact Sig. [2*(1-tailed Sig.)]	.400[a]

a. Not corrected for ties.

b. Grouping Variable: FINANCIAL DISTRESS

Source: SPSS Output

Table 19 shows the result of Mann-Whitney U test for testing the difference of net income growth ratio between large, non-distress firm and large, distress firm. The asymptotic significance (2-tailed) value of 0.209 is larger than the significance level of 0.05, so H_0 is not rejected. It shows a strong evidence that there is no difference between net income growth ratio of non-distress firm and distress firm in large firm group.

2) Small, non-distress firm compared to small, distress firm

Table 20. Mann-Whitney U test result for Net Income Growth Ratio, small, non-distress firm to small, distress firm

Test Statistics[b]

	NET INCOME GROWTH RATIO, SMALL FIRM
Mann-Whitney U	.000
Wilcoxon W	45.000
Z	-1.793
Asymp. Sig. (2-tailed)	.073
Exact Sig. [2*(1-tailed Sig.)]	.200[a]

a. Not corrected for ties.

b. Grouping Variable: FINANCIAL DISTRESS

Source: SPSS Output

Table 20 shows the result of Mann-Whitney U test for testing the difference of net income growth ratio between small, non-distress firm and small, distress firm. The asymptotic significance (2-tailed) value of 0.073 is larger than the significance level of 0.05, so H_0 is not rejected. It shows a strong evidence that there is no difference between net income growth ratio of non-distress firm and distress firm in small firm group.

3) Large, non-distress firm to small, non-distress firm

Table 21. Mann-Whitney U test result for Net Income Growth Ratio, large, non-distress firm to small, non-distress firm

Test Statistics[b]

	NET INCOME GROWTH RATIO, NON-DISTRESS
Mann-Whitney U	33.000
Wilcoxon W	78.000
Z	-.684
Asymp. Sig. (2-tailed)	.494
Exact Sig. [2*(1-tailed Sig.)]	.546[a]

a. Not corrected for ties.

b. Grouping Variable: FIRM SIZE

Source: SPSS Output

Table 21 shows the result of Mann-Whitney U test for testing the difference of Net Income Growth Ratio between large, non-distress firm and small, non-distress firm. The asymptotic significance (2-tailed) value of 0.494 is larger than the significance level of 0.05, so H_0 is not rejected. It shows a strong evidence that there is no difference between net income growth ratio of large, non-distress firm and small, non-distress firm.

4) Large, distress firm compared to small, distress firm

Table 22. Mann-Whitney U test result for Net Income Growth Ratio, large, distress firm to small, distress firm

Test Statistics[b]

	NET INCOME GROWTH RATIO, DISTRESS
Mann-Whitney U	.000
Wilcoxon W	1.000
Z	-1.000
Asymp. Sig. (2-tailed)	.317
Exact Sig. [2*(1-tailed Sig.)]	1.000[a]

a. Not corrected for ties.

b. Grouping Variable: FIRM SIZE

Source: SPSS Output

Table 22 shows the result of Mann-Whitney U test for testing the difference of Net Income Growth Ratio between large, distress firm and small, distress firm. The asymptotic significance (2-tailed) value of 0.317 is larger than the significance level of 0.05, so H_0 is not rejected. It shows that there is no difference between net income growth ratio of large, distress firm and small, distress firm.

Since the first hypothesis is rejected, the research has to end at this stage. Therefore binary logistic regression will not be performed.

CHAPTER V

CONCLUSIONS AND SUGGESTIONS

A. Conclusions

As the analysis has been performed, the research findings and analysis have reached several conclusions.

1. The result of the first stage of test of difference has shown that there is no statistical difference between ratios of non-distress and distress firms. Furthermore, the result of the second stage of test of difference has shown that there is no statistical difference between ratios of non-distress and distress firms which are grouped into large and small firm size. These facts lead to a decision to reject the first hypothesis. In conclusion, financial ratios do not serve as a predictor of financial distress for real estate and property firms and firm size does not affect the use of financial ratio in the prediction of financial distress for real estate and property firms.
2. Financial ratio does not always be a predictor of financial distress for firms in all industry sectors at all time. This study is inspired by similar study by Almilia and Kristijadi in 2003, in which the sample include manufacturing firms and the observation period of time extends from 1998 to 2001. Almilia and Kristijadi's research concludes that profit margin ratio, current ratio, financial leverage ratio, and net income growth ratio are significant predictors of financial distress. In contrast with the result of Almilia and Kristijadi's research, this study proves that the four financial ratios

mentioned above are not significant predictors of financial distress for real estate and property firms. This fact indicates that firms in real estate and property sector are prone to extrinsic factors which change over time. The factors include macroeconomic condition, political condition, and environment. Macroeconomic condition may affect this industry sector through the change interest rate of Certificate of Bank Indonesia, which in turn causing change in interest rate of housing credit. When the interest rate of Certificate of Bank Indonesia increases, the interest rate of housing credit will decrease. This influences house sales, as purchasing power decreases and consumers are more reluctant to buy houses. Political instability may cause multiplier effects to macroeconomic condition. Environmental condition may cause losses as floods and earthquakes destruct ready-for-sale houses. Firms in real estate and property rely on the sale of houses and buildings and spend a huge amount of capital before booking real profit. The extrinsic factors can cause the firms to make abnormal performance regardless the intrinsic performance of the firm. In conclusion, extrinsic factors greatly affect the firms' financial performance and therefore it is inappropriate if the prediction of corporate financial distress always rely on intrinsic factors only.

B. Suggestions

The following are some suggestions for further researches about the prediction of financial distress using financial ratio:

1. Prediction of financial distress using financial ratios should be applied to firms in industry sectors with relatively stable performance such as manufacturing industry.
2. As size effect does not affect the prediction of financial distress using financial ratio, further research can be conducted to investigate other factors that might influence the prediction model, such as industry effect, macroeconomic factors, and political factors. In line with the result of this research, extrinsic factors like macroeconomic factors and political factors might somehow affect the behavior of the firms, causing the firms to produce abnormal financial performance. In such situation, macroeconomic factors and political factors need to be taken into account in the prediction of corporate financial distress. However, macroeconomic factors and political factors must be measured accurately and be translated into meaningful numerical terms.
3. It is better to have a large sample size in research. According to Gauss-Markov theorem, large sample size ensures normal data distribution. When data distribution is normal, the data analysis can be performed using parametric test, which is somehow considered more powerful than nonparametric test.

4. All major financial ratios need to be included in the prediction model of financial distress. Some ratios might be strong indicators of corporate financial distress in a particular industry sector, but they might be of lesser significance in the prediction of corporate financial distress in other industry sectors. The inclusion of all major financial ratios in the prediction of financial distress ensures a more comprehensive analysis.

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APPENDICES

LIST OF FIRMS AND AVERAGE VALUES OF FINANCIAL RATIO

COMPANY NAMR	RATIOS				
	PROFIT MARGIN	CURRENT RATIO	FINANCIAL LEVERAGE	NI GROWTH	Market Capitalization
PT Lippo Karawaci Tbk	0.20	1.11	0.59	0.02	5,371,690,551,086
PT Summarecon Agung Tbk	0.20	0.78	0.46	0.01	2,141,049,324,480
PT Jaya Real Property Tbk	0.19	1.35	0.28	0.01	1,975,450,000,000
PT Jakarta Setiabudi Intl' Tbk	-0.05	0.84	0.21	-0.02	1,660,214,976,000
PT Jakarta International Hotel & Dev Tbk	0.56	0.89	0.51	-0.02	1,153,198,582,000
PT Pakuwon Jati Tbk	0.72	0.55	0.54	0.02	1,109,607,012,000
PT Duta Pertiwi Tbk	0.07	0.78	0.51	-0.01	1,008,712,500,000
PT Dharmala Intiland Tbk	0.04	0.91	0.73	-0.01	708,950,706,600
PT Duta Anggada Realty Tbk	0.31	0.29	1.01	-0.02	548,363,577,720
PT Modernland Realty Ltd Tbk	0.19	0.62	0.69	0.02	499,360,627,537
PT Surya Semesta Internusa Tbk	0.00	0.73	0.34	-0.01	464,687,777,500
PT Indonesia Prima Property Tbk	0.16	0.16	0.48	-0.01	385,645,000,000
PT Suryamas Dutamakmur Tbk	-0.20	0.09	0.74	-0.01	207,549,623,280
PT Pudjiadi & Sons Tbk	0.07	1.58	0.22	0.00	107,931,841,472
PT Bhuwanatala Indah Permai Tbk	-0.29	0.32	0.26	0.02	102,880,135,914
PT Lamicitra Nusantara Tbk	0.03	1.79	0.43	0.00	99,912,426,000
PT Pudjiadi Prestige Limited Tbk	0.07	0.98	0.31	0.00	66,360,000,000
PT Metro Supermarket Realty Tbk	0.12	0.55	0.25	0.00	49,480,200,000
PT Gowa Makassar Tourism & Dev Tbk	0.12	0.50	0.71	0.00	46,910,736,000
PT Karka Yasa Profilia Tbk	0.01	1.52	0.35	0.00	38,888,941,500