pany organization forecasting. This theoretical and practical progression is caused by the increasing of complexity, competition, and environment alteration. The necessity to understand the future based on a rational thinking grows rapid. Therefore, business forecasting has a position, which is very strategic in business administration process, especially in taking decision process. Business forecasting is very beneficial to organization internal, such as management since it can evaluate and control how far company’s work in performing its operation, or to company people external, such as security analysis, institution, lending, and investors. It is so important of business forecasting that the forecasting that was made hoped to be close to the truth or having a high accuracy, so that the people who used it believe in forecasting which was made, and the decisions which are taken will be much better. Company’s business forecasting can be done by company’s management by using forecasting techniques which is usually used with other considerations and according to forecasting management it is able to be close to accuracy. Business forecasting can also be implemented by security analysis. The analysis implementing the forecasting is also using forecasting techniques with other considerations so that the forecasting which was made hoped to be close to the truth.

Research in business forecasting, especially to earnings, has been done. The research are connecting earning forecasting to variety context like what have been implemented by Foster (1977a) who evaluates earnings expectation models by testing model ability with model error, which is used to predict. Then Patell (1976a) who tests information content from earning forecast which was made by management. Some other researches, such as Copeland Marston (1972), Hagerman and Ruland (1977), and McDonald, Lovel, and Patz (1976) summarized that forecast, which was made by management, appears to be accurate after being proved by its forecast realization. On the other hand, research result which has been done by Cragg and Malkiel (1968), and Ellon and Gruber (1972), summarized that the forecast, which was made by security analysis, appears to be accurate after being proved by its forecast realization. Afterwards, the researches compare forecast accuracy such as being done by Basi, Carey, Twork (1976) who try to compare the forecast that is made by security analysis. They compare earning per share forecast which was made by management that is reported in the Wall Street Journal with earning per share forecast made by security analysis and reported in Standard and Poor’s Earning Forecasting at same time. The research result showed that earning per share forecasting made by financial analysis appears not to have a superiority, or other words its less accurate if it is compared to the forecast made by management, but actually the forecast quality of those both sides is relative low. William Rulland (1978) also compares forecast accuracy made by management and forecast made by security analysis, which its result showed that when forecast notification made by analysis, which was done before the forecast notification made by management, has a less accurate result compared to the forecast made by management.

Business forecasting can be done by using available forecasting techniques. Many forecasting techniques, which are used presently, have been developed since 19th century, for example regression analysis. But, there are also some new forecasting techniques, which are developed recently, those are Box-Jenkins methods (Aryad, 2000). In some literature mentions that business forecasting can be done by techniques, such as naïve method, regression, smoothing, decomposition, and the technique which is developed recently, i.e. Box-Jenkins. Research in this forecasting technique accuracy is done by Brown and Roseff (1978) who compare earning forecast accuracy made by security analysis with some models, Box-Jenkins and Naive, which its results summarized that the forecasting, which has been made by using Box-Jenkins model, has a more accurate result than naïve model’s, and the forecast made by security analysis will appear to be accurate if it is compared to both Box-Jenkins and naïve model. Afterwards, the research done by Suvardjono (2002) compares forecasting accuracy made by financial analysis and forecasting that is made mechanically for industry and gas companies by considering homogenous. The research summarized that forecasting made by security analysis is more accurate than forecasting made mechanically.

Basically, a business forecasting is needed by almost all the economic entity, especially to earning forecasting since the earning forecasting can be used as a basic of taking decision dealing with steps that will be taken, weather in company internal, capital market, or researches, like what have been mentioned above that many forecasting techniques have been found, and researches comparing forecasting techniques accuracy that have been found, have already been done. To Indonesia, research comparing forecasting technique accuracy has never been done. However, earning forecasting needs the best mechanic methods so that the decisive, which are taken will be much better and appropriate. In some literatures mentioned that Box-Jenkins method is indicated theoretical as a best method among other methods since the method has to go through steps, which has to be passed so that it can result an appropriate model. Therefore, this research attempts to find the best forecasting techniques by proving available forecasting techniques accuracy and applied in Indonesian economics condition. In this research, the mechanic meth-
ods chosen by the writer are naïve, simple regression, and Box-Jenkins method.

Problem Statement

The research, which is about earning forecasting technique accuracy, has never been done especially to Indonesia. In this case, the writer tries to investigate the accuracy of forecasting techniques in some literatures by proposing statements of the problem that are formulated in questioner as follows:
1. Among earning forecastings, which are made by using naïve, regression, and Box-Jenkins method, which one of those earning forecasting that has a more accurate result.
2. If among those three techniques is more superior or accurate, what factors causing the technique is more accurate.

Research Motivation

The research motivated by previous researches, which compare earning forecasting accuracy done by management, security analysis, or even mechanically. In Indonesia, research like this one has never been done whereas in fact this research is very beneficial to people who have connection with business travel that they do. Numbers in earning forecasting can become a basis of taking decision in capital market. Since the capital market is a center of investment transaction, an investor needs a view of company condition so that the investor is able to take a decision whether to continue investment or not. Therefore, this research is hoped to be able to provide contribution to them dealing with the best forecasting methods that can be used, so that the steps, which are implemented, can be taken appropriately. This research is also very beneficial for further researches since whatever result it will be from a research, it is not absolutely right. Thus, the researches need to be implemented again because in a certain condition, the more accurate methods can not be applied, so is needed further testing.

CHAPTER II
THEORETICAL BACKGROUND AND HYPOTHESIS

Forecasting Definition

Development nowadays shows that in compliance with more complex of trade world, necessity to understand future based on rational thinking becomes more rapid. Thus, business forecasting or trade has a strategic position in company trading administration process especially connecting to taking decision. Necessity of forecasting is to see future situation becomes important and necessary because situation changes faster, since company environment and new technology require an industrialist to do forecasting. In doing a forecast depends on characteristic of process that will be predicted. If there is no change, of course the reality that happened in the past time is the forecast of future. Thus, if the change is constant, future horizon situation can be determined by using past data, but if there are some things causing interrupted situation, it will be difficult to forecast future situation based on past situation.

In matter of management and administration, planning is a necessity, which is big since the spare time to take decision will be about from some years, like in capital investment, or some days, or even some hours, like in production and transportation scheduling. Thus, forecasting is a helping tool, which can be said important in planning that is effective and efficient. Perspective dealing with forecasting may be equally in various to view of each scientific method group, which is believed by decision taken. Common people may ask how far validity and efficiency of knowledge discipline proposing to predict uncertain future situation. However, it needs to be known that there has been rapid development in forecasting, which is used to predict trade in future and of course it will be very beneficial in taking decision of steps that will be taken.

Apart from those problems above, there are two important things that have to be memorized, the first is that success in a forecast is not always profitable directly to people who need it. The second, distinction among beyond control external event, such as national economic situation, government, consumer, or competitor, and internal event that can be controlled, like in company decision taking in a matter of marketing or manufacturing (Makridakis, Wheelwright, McGee, 1987). So, success of a company depends on both types of event. Forecasting has a direct role on the first type of event (external), second event (internal), and planning is a link, which integrates both events.

Earning Forecasting

Forecasting of company earning can also be done since this earning forecast is very useful for both company internal, such as management and company external, such as security analysis, lending institutions, or investor. Since earning forecast can be used to evaluate how far company’s work in implementing its operation, or can predict return possibility, which will be achieved by investor if she/he will do investment. Earning
such as investment. An investor will be able to either take investment decision or not, or in a matter of credit confirmation, company restructuring, etc since the earning forecast, which has been announced, has information content that can influence many various things, such as stock price. (Patell, 076a). It’s so beneficial of an earning forecasting that the people who need it are more believe or more to be exact will be sure with the forecast and the decisions taken by those people will be much better. Therefore, the result of the forecast is hoped to be close to its realization or having a high accuracy.

In some literatures mentioned that in forecasting earning can be done by company management, security analysis, or other people by using mechanical procedure. Researches about this earning forecasting have a lot been done, like what have been done by Patell (1976) who test existence of information content from management forecast and pronouncing forecast, which is linked to stock price movement. Patell said that in fact the data, which are revealed in management forecast, and in pronouncing the forecast that is done voluntarily, actually can convey information to the market. This can support normatively signaling theory, this theory said that the manager has more information about company, and will always tries to inform the true condition of the company. The information of company is a signal or code to external sides, such as investor who can be used in taking decisions. But, the weakness of this theory is when the management has “good news” about its company, the management will reveal its forecast but in fact the management has “bad news” about its company, so the management trends towards not reveal the result of its forecast.

Another research, which is done by William Ruland (1978), concluded that the forecast made by management is more accurate since the management has more information from inside of the company. Afterwards, the research done by Brown and Rosett (1978) tests the accuracy of earning forecasting made by security analysis and compare this accuracy to Box-Jenkins (1976), which is used to calculate the forecast. This research concluded that the forecast made by using Box-Jenkins model is more accurate compared to naive mode, and the forecast made by security analysis is more accurate compared to the forecast by using Box-Jenkins and naive model. But, other researches, such as Crag And Malkiel (1968), and Elto and Gruber (1972) concluded that the forecast made by the security analysis is not more accurate if it is compared to the forecast by using time-series model.

Some literatures said that prediction capability of security analysis and time series model have superiority and weakness. Security analysis has capability, such as they can collect information from various sources, afterwards it is able to adjust structural changes immediately, on the other hand time series model that can be counted by using regression formula or average of earning previous years has capability, such as detecting and exploiting of systematic pattern previous years, calculating confidence interval of forecasting, and the cost that is paid is low. For the weakness of security analysis needed very high individual capability, and the cost, which is expensive, is also high. On the other hand, the weakness of time-series model are the supplying numbers, which are observed, are very high, and the difficulties in communicating with client.

As it has been said that earning forecasting can be implemented by management using available forecasting techniques and company internal information because the management knows much about the condition of company than other sides. Earning forecast also can be implemented by security analysis combining available forecasting techniques with information both received from company external and internal. Some researches said that earning forecasting made by management are more accuracy made by using technical and naive model to forecasting made by using Box-Jenkins technique. The result of the research concluded that Box-Jenkins technique is more superior than naive technique. In this case, the writer tries to do testing towards the accuracy of other forecasting techniques.

Data Behavior

There are two important things that have to be concerned in process of profitable and accurate forecasting making. First, the data of the collecting data, which is relevant, are information that can result accurate forecasting. Second is choosing an appropriate forecasting method exploring data information received as optimal as possible. In addition to those important things, other things that have to be concerned are re-examine previous experiences in forecasting expected variables. To management, for example, needs to apply literature study or discussion with partners so that can help and understand the success or failure of approaches in past time. And an analysis also has to find information continually, which influences its forecasting.

Data that are needed in doing forecasting can be received from two sources, i.e. internal and external. Internal data is gained from inside of the company itself, but external data is gained from outside company, which is divided into two types, i.e. primer and seconder. Primer data is the data collected and processed by organization publishing or using it, but the seconder data is the data proclaimed by organization, which is not
the organizer. Observation of data is often made in long time. Every variable consists of collected, noted, or observed data in long time series called regulation data or time series (Arsyad, 1993). This regulation data analysis try to explain or concerns the data serial behavior.

Earning forecasting methods

Some literatures mentioned techniques or models that can be used as a tool to forecast earning. The models are also adjusted with company internal condition, company external, and data long term, which is needed. Forecasting method that is usually used by the forecaster is naive method. This method consider that observation of time period that has just passed (last year, last month, etc) is the best forecasting tool to forecast future condition (Arsyad, 1987). Naive method is often used by many researchers, such as management and security analysis, because this method is very easy and in stable condition, so this method can be reliable. Afterwards, other methods, which are usually used are regression method. Regression method showed that a forecast is regarded as the function of a number of factors determining the result of forecasting, and the forecast does not have to depend to time (Makridakis, Wheelwright, McGee, 1987). Other forecasting methods can be seen in detail on table 1.

Table 1. Types of Forecasting Techniques

<table>
<thead>
<tr>
<th>Metoda</th>
<th>Pola Data</th>
<th>Jangka Waktu</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sederhana</td>
<td>ST, T, M</td>
<td>Pendek</td>
<td>Time Series</td>
</tr>
<tr>
<td>Rata-rata Sederhana</td>
<td>ST</td>
<td>Pendek</td>
<td>Time Series</td>
</tr>
<tr>
<td>Rata-rata Bergerak</td>
<td>T</td>
<td>Pendek</td>
<td>Time Series</td>
</tr>
<tr>
<td>Pemulusan Exponensial</td>
<td>ST</td>
<td>Pendek</td>
<td>Time Series</td>
</tr>
<tr>
<td>Regresi Sederhana</td>
<td>T</td>
<td>Pendek</td>
<td>Kausal</td>
</tr>
<tr>
<td>Regresi Berganda</td>
<td>M, S</td>
<td>Menengah</td>
<td>Kausal</td>
</tr>
<tr>
<td>Dekomposisi Klasik</td>
<td>M</td>
<td>Pendek</td>
<td>Time Series</td>
</tr>
<tr>
<td>Trend Exponensial</td>
<td>T</td>
<td>Menengah</td>
<td>Time Series</td>
</tr>
<tr>
<td>Box-Jenkins</td>
<td>ST, T, S, M</td>
<td>Pendek</td>
<td>Time Series</td>
</tr>
<tr>
<td>Ekonometri</td>
<td>S</td>
<td>Pendek</td>
<td>Kausal</td>
</tr>
</tbody>
</table>

Data Pattern Explanation:
ST: Stationary, T: Trend, M: Musiman (Season), S: Sklis (Cyclical)

From various types of the forecasting techniques above, the writer only chooses three forecasting techniques, i.e. naive method, simple regression, and Box-Jenkins method, which are developed recently. Afterwards, from the three techniques, the writer compares the level accuracy. The reason why the writer chooses those methods is that those methods are often used and applied in companies in Indonesia, especially to naive and simple regression method. Naive method is often used because the calculation of this method is very simple, that is calculating future earning forecasting only by considering previous earning without considering other factors. To regression method, in forecasting earning, will need other variables consideration. To Box-Jenkins method, companies in Indonesia are still seldom to use it because this method is more complex and little bit difficult to use it for the first time. With these reasons, the writer tries to observe by comparing the earning forecasting accuracy of those three methods.

Some literatures define that naive model is the simplest model. This method assumes that previous period (the last period) is the best predictor of future. Naïve method shows trends so that the trends can be observed. Naïve method is really simple, cheap, and its result is more close to accuracy in order to forecast earning in short term. Simple regression method is also applied to forecast earning of companies in Indonesia. This method observes linear relationship of two variables, i.e. dependent and independent variable. In linear relationship, if we know its independent, we can forecast the dependent variable. The result of forecasting by using regression method is more to be close to accuracy because this method considers other variables besides predicted earning variables, such as selling, cost, or time. From this explanation, the hypothesis, which is found is:

H1 = Simple regression method is more accurate than naïve method in forecasting earning.

From hypothesis above mentioned that the result of forecasting by using regression method is predicted more accurate if it is compared to naïve and Box-Jenkins method because this method considers other variables accepts forecasted variables. But, in technology development recently there is a technique, which is still seldom and even has not been applied yet in Indonesia, i.e. Box-Jenkins. This method was found for the first time by George Box and Gwylim Jenkins in 1976, which often called as Autoregressive Integrated Moving Average model (ARIMA). Autoregressive model (AR) is introduced for the first time by Yule (1926) and then developed by Walker (1951), on the other hand Moving Average (MA) is used for the first time by Slutsky (1917). But, the person who
succeeded in finding theoretical foundations of ARMA combination process is Wold (1939). Wold formed ARMA model, which is developed into three directions, i.e. ARMA process (combination), extension of the results to include seasons scale series, and simple development including non-stationary processes (ARIMA). Afterwards, in 1976 Box and Jenkins has succeeded effectively in reaching agreement dealing with relevant information, which is needed to understand and use ARIMA models. This method is the special technique of linear test. In this model, forecasting process really ignores independent variable. Some literature said that ARIMA is a tool using present values and past values of dependent variable in order to result accurate short term forecasting. Box-Jenkins method is different with almost all other forecasting methods because this method using iterative approach in identifying the most appropriate model of all possibility available model. Basically, in using Box-Jenkins method, there are three stages that have to be done by forecaster, first, identify appropriate model, second, estimates parameter of temporary model, third, tests and applies chosen model.

Dealing with the data, which is needed in Box-Jenkins method, in table 1, mention that data that is used has to be stationary. Intuitive, stationary data is the time series data, which has constant average. On the other hand, available data is non stationary commonly. In order to make stationary data, we will do differencing.

From the review above, it can be concluded that earning forecasting using Box-Jenkins is really considering many factors and has to do some processes. Thus, this method will result forecast value, which is more accurate compared to other methods. This prediction is also supported by research result done by Brown and Rozeff (1976) concluding that earning forecasting by using Box-Jenkins method, and the result is more accurate if compared to naive method. From the review above, hypothesis proposed by the writer is:

\[ H2 = \text{Box-Jenkins method is more accurate than simple regression method in forecasting earning.} \]

\[ H3 = \text{Box-Jenkins method is more accurate than simple regression method and naive method in forecasting method.} \]

CHAPTER II
RESEARCH METHODOLOGY

Data Collection and Sample Election

In this research, the writer uses secondary data. The data are the financial report data (earning) of companies in Indonesia listed in Jakarta Stock Exchange (BEJ) through capital Market Directory. Sample with drawal is done sampling purposively. The company's sample is chosen and categorized according to certain criteria, which are suitable with forecasting techniques usage that will be tested (naive, sample regressions, and Box-Jenkins method). The data that is taken is the data from 1992 to 1996 where the data from 1992 to 1994 are used as a basic year for forecasting, while the data of 1995 and 1996 are used as a comparison between forecasting result and its realization. Conclusion, the writer uses data from 1992 to 1994 in order to forecast earning in 1995 and 1996. The reason why the writer uses year period from 1992 to 1996 is because the economic in Indonesia is still indicated stable, and at that time Indonesia has not experienced monetary crisis yet, so that the company earning has a big possibility to be forecasted. The number of companies, which is taken as samples in this research are 37 companies. These numbers are the number of the companies listed in Jakarta Stock Exchange for 5 years (from 1992 to 1997).

Naive Method

Naive method is the most simple method. Naive method assumed that the past time period observation is the best forecasting tool to forecast future situation. Formula of the method is as follows:

\[ \hat{Y}_t + 1 = Y \ (Y_t - Y_{t-1}) \]

In this case:

\[ \hat{Y}_{t+1} = \text{Earning forecasting value for next period} \]

\[ Y_t = \text{Earning realization value for t period.} \]

In order to use this formula above, the data, which are used to forecast earning in 1995 and 1996, are the data in 1994 and 1993.

Simple Regression Method

Simple regression method is a method attempting to connect other variables dealing with company earning. On other words, this method shows dependent functional among all variables. In this method, a forecast will be announced as a function from a number of factors determining the forecast result. Other variables, which can influence earning variable, are selling, production cost, or time. In this research, the writer will implement earning variable regression of time. Formula of the simple regression method is as follows:
In this case:
\[
\hat{Y} = a + \hat{\alpha}X + \hat{\delta}
\]

Yet in this research, the writer uses statistical test tool, i.e. SPSS (Statistical Program for Social Science). For this research, the data, which is needed, are earning data of 1992, 1993, 1994, 1995 and 1996. For independent variable, the writer uses time, i.e. number 4 and 5, because the earning that will be forecasted is the data on fourth and fifth year (started from 1992).

Box-Jenkins Method

Box-Jenkins method is a forecasting method using autoregressive model, moving average model, or combination of those models, which are usually called ARIMA (Autoregressive Integrated Moving Average). This method ignores independent variable, but considers data pattern that will be used to forecast next period earning. There are some stages in implementing forecasting by using Box-Jenkins. The stages are as follows:

1. Identifying the most appropriate model from all available models possibility (Autoregressive, Moving Average, Combination/ARIMA).
2. Estimating parameter of temporary model.
3. After determining an appropriate model, we implement forecasting with the model chosen by us.

The formula from these models of Box-Jenkins method are as follows:

**Autoregressive (AR)**

\[
Y_t = \beta_0 + \beta_1 Y_{t-1} + \beta_2 Y_{t-2} + \ldots + \beta_p Y_{t-p} + \epsilon_t
\]

In this case,
\[
Y_t = \text{Forecasting value of next period (independent variable)}
\]
\[
Y_{t-1}, Y_{t-p} = \text{Independent variable is lag of independent variable}
\]
\[
\beta = \text{Regression coefficient}
\]
\[
\epsilon_t = \text{Residual}
\]

**Moving Average (MA)**

\[
Y_t = \hat{\omega}_t - W_1 \hat{\epsilon}_{t-1} - W_2 \hat{\epsilon}_{t-2} - \ldots - W_q \hat{\epsilon}_{t-q}
\]

In this case,
\[
Y_t = \text{Forecasting value of next period (independent variable)}
\]
\[
w_1, w_2, w_q = \text{Weight}
\]
\[
\hat{\epsilon}_t = \text{Residual}
\]
\[
\hat{\epsilon}_{t-1}, \hat{\epsilon}_{t-q} = \text{Previous residual value (lag)}
\]

**Autoregressive Moving Average (ARIMA)**

\[
y_t = \beta_0 + \beta_1 y_{t-1} + \beta_2 y_{t-2} + \ldots + \beta_p y_{t-p} + \epsilon_l - \epsilon_{t-1} - \epsilon_{t-2} - \ldots - \epsilon_{t-q}
\]

This formula is the combination of AR and MR:

Data that are used for Box-Jenkins method are data 1992, 1993, and 1995. On the other hand, in calculating parameter for Autoregressive model, the writer uses non-liner least square method. Afterwards, by concerning data pattern, which is not stationary gained by the writer, this research uses ARIMA model (2,0,0). This model showed that the earning, which will be forecasted, is very depending to previous two year earning (Autoregressive).

The Significant differential between Box-Jenkins and other methods is that Box-Jenkins do not determine assumption about a number of requirement or relative weight towards the requirements.

**Used Variables**

As what have been said above that company earning is the variable, which is used to predict. For naive method, used variable are the earning from 1994 and 1995 to forecast earning 1996 and 1996. For regression method, the dependent variable are the earning 1992 to 1996, but the independent variable the writer uses time, i.e. number 4 and 5. The variable of Box-Jenkins method that is used are earning 1992 to 1994 in order to forecast earning 1995 and 1996.

**Data Analysis**

Data analysis method that is used in this research uses formulas in order to measure forecasting error. Error measure of forecast can be a foundation to estimate a forecast accuracy. Much bigger the forecast error is much smaller the forecast accuracy and on the contrary, much smaller forecast error is much bigger forecast accuracy. Forecasting error measurement here focuses on Dispersion of forecast where there are two similarities:
Mean Absolute Percentage Error (MAPE), with formula as follows:

\[ \text{MAPE} = \frac{1}{N} \sum_{t=1}^{N} |X_{t,t} - E(X_{t,t})| \]

In this case,
- \( X_{t,t} \) = Forecast variable realization in \( t \) period for \( i \) company
- \( E(X_{t,t}) \) = Forecast variable in \( t \) period for \( i \) company
- \( N \) = Number of test cases

The formula shows the average of all errors of sample and gives the same weight for every error unit. Much smaller MAPE, which is resulted, is much more accurate method, which is used.

Mean Square Error (MSE), with formula as follows:

\[ \text{MSE} = \frac{1}{N} \sum_{t=1}^{N} (X_{t,t} - E(X_{t,t}))^2 \]

In this case,
- \( X_{t,t} \) = Forecast variable realization in \( t \) period for \( i \) company
- \( E(X_{t,t}) \) = Forecast variable in \( t \) period for \( i \) company
- \( N \) = Number of test cases

This formula shows error average of sample, but it gives higher weight of extreme forecast error value.

The formula above used to measure forecasting error. After knowing the forecasting error of those three methods, the writer uses ANOVA test tool (Analysis of Variance) in order to test those three methods above, to compare the accuracy of those three methods, and to test hypothesis that has been mentioned.

EMPIRICAL RESULT

Data Testing

In this research, the number of company earning data, which are taken for this research, are 37 companies in Indonesia listed in Jakarta Stock Exchange. Type of the companies is not distinguished, so in the sample, there will be trading company, service company, or even manufacturing company. The writer does purpose sampling of earning data. Earning data, which are taken, are the data showing trend increasing from 1992 to 1996. From the whole data, which are from 1992 to 1996, the writer does earning forecasting 1995 and 1996 by using naive method with formula that has been mentioned on previous chapter. Since naive method only needs two years previously than years, which will be forecasted its earning, the data that are used to apply this method are the earning data of 1994 and 1993 in order to forecast earning 1995 and 1996. The next step is that implementing earning forecasting by using simple regression method. This method needs independent variable to calculate dependent variable, in this matter of earning on period, which will be forecasted, are earning of 1995 and 1996. The independent variable, which is used, is time variable since earning data, which is used, is showing increasing trend. Thus, the earning of 1995 and 1996 assumed that it will experience increasing from previous years. So, regression analysis, writer uses ARIMA model (2,0,5). The aim of this model is the earning, which is forecasted depends on previous two years (Autoregressive).

From the three method forecasting results, the writer calculates the mean of forecasting error by using MSE formula, which has been explained on previous chapter.

Descriptive Statistic

Descriptive statistic describes the situation and distribution of research data. This statistic is also beneficial in describing conclusion and its implication with available data limitation, and can provide common description concerning with trend of population, which is observed. Table 2 shows description statistic values of three methods earning data, which are tested.

From the above table 2, it shows that naive method is the mean error of 24416.01 with deviation standard 47009.36. For simple regression method, mean error of 19361.76 with deviation standard 49530.78, while mean error of Box-Jenkins method is 9344.98 with deviation standard 19119.09.
Table 2. Descriptive Statistic

<table>
<thead>
<tr>
<th>Variable (Forecasting Method)</th>
<th>Minimum Value</th>
<th>Maximum Value</th>
<th>Mean</th>
<th>Deviation Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naive</td>
<td>25.00</td>
<td>297909.00</td>
<td>24416.07</td>
<td>-47711.92</td>
</tr>
<tr>
<td>Simple Regression</td>
<td>42.00</td>
<td>344056.00</td>
<td>19381.76</td>
<td>-49639.92</td>
</tr>
<tr>
<td>Box-Jenkins</td>
<td>10.00</td>
<td>115335.00</td>
<td>9344.96</td>
<td>19132.93</td>
</tr>
</tbody>
</table>

Hypothesis Testing

Hypothesis that has been mentioned above will be tested by using ANOVA one way Bonferoni statistic test (multiple comparisons) since the number of variable, which is tested, is more than two. The result of ANOVA statistic test can be seen on following table:

Table 3. Multiple Comparisons Comparisons of Each Method To Other Methods
Variable Dependent: Mean Error Bonferoni

<table>
<thead>
<tr>
<th>(i) Method (j) Method</th>
<th>Mean Difference (i-j)</th>
<th>Standard Error</th>
<th>95% Confidence Interval Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naive</td>
<td>25.00</td>
<td>297909.00</td>
<td>24416.07</td>
<td>-47711.92</td>
</tr>
<tr>
<td>Regression</td>
<td>42.00</td>
<td>344056.00</td>
<td>19381.76</td>
<td>-49639.92</td>
</tr>
<tr>
<td>Box-Jenkins</td>
<td>10.00</td>
<td>115335.00</td>
<td>9344.96</td>
<td>19132.93</td>
</tr>
</tbody>
</table>

Hypothesis Testing 1
Hypothesis 1 aims to test whether the result of earning forecasting using simple regression method will be more accurate if it is compared to the earning forecast using naïve method. Simple regression method as-
other words, can Box-Jenkins method be regarded as the best method in forecasting earning. From table 3 can be seen that the mean distinction of Box-Jenkins method are -211.593.524 with 0.227 level significance, if it is compared to naive method, but if it is compared to regression method, the comparison is -2880.196 with 0.049 level significant. From this result can be concluded that Box-Jenkins method is more accurate it is compared to naive method, but the comparison is not significant. Yet, if it is compared to regression method, Box-Jenkins method is more accurate and the comparison is significant. So, the third hypothesis is accepted.

From authentication of hypothesis 1, 2, and 3, the writer conclude that the result of Box-Jenkins method usage in earning forecasting will be more accurate if it is compared to both naive and simple regression method. As it is explained before, Box-Jenkins method does have many superiority although the process is more complicated than other methods especially to simple regression and naive method. Some literatures also said that Box-Jenkins method is the most capable to forecast company earning in short term.

CONCLUSION, IMPLICATION, AND LIMITATION

Conclusion

This research aims to compare the accuracy of naive, simple regression, and Box-Jenkins method in forecasting company earning in future. Data that is used in this research is secondary data, i.e. financial report data (earning) of companies in Indonesia listed in Jakarta Stock Exchange (BEJ). Earning period, which is tested, are 1995 and 1996. Earning 1992 to 1994 are used as a basic forecasting period, and earning 1995 and 1996 are used as a comparison between the actual realization and forecasting result. This research tests three hypothesis in order to know the accuracy of three forecasting methods. Data analysis, which is used to calculate forecasting error, uses MAPE formula. Afterwards, to compare the accuracy of three forecasting methods, the writer uses ANOVA one-way Benferroni test tool (Multiple Comparisons).

Hypothesis 1 concluded that simple regression method is more accurate than naive method in forecasting earning. Regression method can be proved that it is more superior since in forecasting earning, this method considers other variables influencing the earning values (independent variable). On the other hand, naive method only considers earning of previous year in order to forecast earning in future. Hypothesis 2 concluded that Box-Jenkins method is more accurate compared to simple regression method. In Box-Jenkins method, the steps that are used is little bit complicated, because it has to do trial-error in order to determine its coefficient. Afterwards, choosing an appropriate method has to be done. In this research, the writer uses ARIMA (2,0,0) in order to calculate forecasting by using Box-Jenkins method. Hypothesis 3 concluded that Box-Jenkins method is the most accurate method compared to both naive and simple regression method.

From those hypothesis testing above, this research can be concluded that Box-Jenkins method is the method that can be reliable in order to forecast earning, although the process is more complicated compared to other techniques, but the result is more close to the accuracy especially in stable economic condition. This result that least provides input to people using methods in order to forecast the earning of company.

Limitation and Research implication

The result of this research has some implication for various people interrelated to account profession, security analysis, management, or accounting research doer. In making feasibility study, an account needs a forecasting method to forecast financial condition in future. Therefore, the account needs the best forecasting methods to do it. Implication to a security analysis is in doing assessment towards companies stock, which will be sold or tendered to public. By using an appropriate forecasting method, an analysis will be able to forecast the condition of the company which is go public, so that the analysis can provides input or suggestion to investors who will be invested their capital to the company that they choose. On the other hand, for the management is in withdrawals of decisions especially connecting to company financial. By using an appropriate earning forecasting, the company can well predict its financial especially to companies that will sell their stock to public. For accounting research doer, this research can provide implication to next researches by using other forecasting methods testing, or by using the same method but different period. Thus, the innovation of this research are hoped to be supported by next researches.

This research, which have been done, have some limitation that needs to be concerned. First, this research aims to compare the accuracy of forecasting method in certain period. The result of this research may be different if the tested period is different. For instance, testing result of the tested period 1985 to 1990 may conclude that simple regression method is more superior or accurate compared to naive or Box-Jenkins method. Second, forecasting method is compared only to 3 methods of all meth-
ods, it can be concluded that Box-Jenkins method is not more superior than other tested methods. From this limitations can be used as a reference or revision for next researches.

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THE EFFECT OF KNOWLEDGE, AND RULES, PRO CEDURES AND POLICIES (RPPs) ON ROLE OF LOCAL LEGISLATURE IN LOCAL FINANCIAL CONTROL

(A Case Study of Regency and Municipal Legislatures in Bengkulu Province)

Rini Indriasati1 and Revisond Baswir2

Program Studi Akuntansi
Program Fakultas Ekonomi Universitas Gadjah Mada

ABSTRACT

This study examines what budget knowledge, and RPPs (rules, procedures, and policies) potentially influence on the role of local legislature in local financial control. In this study, the dependent variable is role of local legislature in local financial control, and independent variables are budget knowledge and RPPs.

The study sample was drawn from regencies and municipal in Bengkulu province: Kabupaten Bengkulu Selatan, Bengkulu Utara, Rejag-lebong, and Kota Bengkulu. The questioner distributes are 147 questioner to local legislature members. Questioner returned are 117 questioner, an of this amount 97 questioner can be processed.

Result of partial hypothesis test can support first hypothesis (H1). In other words, budget knowledge influence significantly on local legislature role in local financial control in regencies and municipality in Bengkulu Province. Result of partial hypothesis test cannot support H2, indicated that RPPs do not influence significantly. Beside partial hypothesis test, regression result also indicate that variability of role of local legislature in local financial control is influenced by independent variables of budget knowledge and RPPs is significant with determination score (R²) smaller than 20%.

Key words: budget knowledge -- RPPs (rules -- procedures, and policies) -- local legislature -- role of local legislature -- and local financial control.

1. Fakultas Ekonomi, Universitas Bengkulu, Bengkulu.
2. Fakultas Ekonomi, Universitas Gadjah Mada, Yogyakarta.