CHAPTER III
RESEARCH METHODOLOGY

3.1   Research Planning

This research paper applies quantitative method, analyzing each variables' relationships systematically. The analysis will be based on financial data from companies originating from both Indonesia and China. The focus of this research will be the relationship of the working capital management of companies with their profitability. Data gathered will consist of company's cash flow (includes receivables and payables), inventories, and effective working capital.

The research will utilize programs in the analysis. The programs used are IBM SPSS Statistics and Stata. Collected data variables will pass series off preliminary tests, to validate and check the consistency of the data. These variables will then be analyzed to find the relationships between those variables, whether they match the hypothesis statements.

3.2   Research Object

The objects of this research are the reports of financial activities from a total of 60 companies which are selected from both Indonesia and China's companies that are listed in the stock market of each corresponding countries. The data will be gathered in a period of 4 years. For each country, 30 companies are selected from the list of companies in the stock market. The financial reports of each company from Indonesia are acquired from Indonesian Stock Exchange, while the reports of Chinese companies are acquired from Shanghai Stock Exchange. The criteria of selected companies are those in the manufacturing industry, as in producing and

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selling their own manufactured products. This criterion is chosen due to this type of industry's cash flow and working capital have a considerable influence on its financial activities, considering that it cannot generate cash in a short amount of time. The selected objects of this research are representative from both Indonesia and China as the author is currently studying in China based on an International program, and considering having a broad analysis will help in confirming the actual result. Having a similar result from both representatives will strengthen the author's hypothesis on this research.

3.3   Operational Variable Definition

Operational variable is the utilized variable for testing hypothesis. There are 2 operational variables, variable X, and variable Y, with variable X representing the independent variable and variable Y representing the dependent variable. In order to obtain targeted results, these variables must first be defined:

3.3.1 Independent Variable

This variable is not bound to the influence of other variables and instead, it influences the value of dependent variable. In this paper, the independent variables are number of days inventory, average collection period, average payment period, cash conversion cycle and working capital. The indicators of number of days inventory are cost of goods sold and total inventory. The indicators of average collection period are account receivables, net credit sales, and notes receivables. The indicators of average payment period are account payables, net credit purchases, and notes payables. The indicators for cash conversion cycle are number of days inventory, average collection period, and average payment period. The indicators

of working capital are current assets and current liabilities. The formula of the described independent variables are as below:

$$INV = \frac{inventory}{cost\ of\ goods\ sold} \times 365$$

$$ACP = \frac{account\ receivables}{total\ sales} \times 365$$

$$APP = \frac{account\ payables}{total\ sales} \times 365$$

$$CCC = INV + ACP - APP$$

$$WC = current\ assets - current\ liabilites$$

Description: INV   : Number of days inventory

ACP   : Average collection period

APP   : Average payment period

CCC   : Cash conversion cycle

WC   : Working capital

3.3.2 Dependent Variable

This variable is bound and influenced by other variables (independent variables). In this paper, the dependent variable is return on assets. The indicators of this variable are total sales revenue and total assets. The formula of the described dependent variable is as below:

$$ROA = \frac{net\ income}{total\ assets}$$

Description: ROA   : Return on assets

3.4   Data Sampling Technique

The data used in this research are financial reports of companies. This means that the data this research is based on are secondary data. This research gathers information from published financial reports of companies in the stock exchange offices.

Data are collected from each country's stock exchange market official websites. Beforehand, companies are filtered to match this research's object criteria. Companies with matching criteria are then selected and their financial reports are collected for analysis. From each company's reports, data from each variables indicators are gathered for further analysis.

3.5   Data Analysis Method

The data analysis method employed in this research is divided into several steps, as described below:

3.5.1 Outlier – observation test

Outliers are residual values that deviate from the rest of residuals, causing model not to fit with the corresponding data. This preliminary analysis is to test the existence of outliers due to the broad variety of object companies. There are two methods to manage outliers, winsorization or data removal. Winsorization is implemented in this research, with outliers at the 5 and 95 percent levels by replacing the extreme observations with the nearest non-outlier observation (Afrifa & Padachi, 2016). This action is taken because balanced panel data are required for this research.

3.5.2 Heteroscedasticity test

Heteroscedasticity defines as a situation in which the variability of a certain variable is inconsistent across the influence of another variable. In other words, the values of the variable may differ significantly in each sequence. To detect heteroscedasticity, this research employs the Breusch-Pagan test. This test can be employed through the use of IBM SPSS Statistics

3.5.3 Serial correlation test

The data used in this research is based on 4 years period and is vulnerable to serial correlation (autocorrelation). Because it is period based, errors may transfer from one period to another. This may affect the analysis results causing it to show incorrect values. This serial correlation error can be prevented through the use of robust standard error in estimating the model.

3.5.4 Descriptive statistics

Descriptive statistics refer to the data by summarizing the whole information contained statistically. The information described in this statistics includes the total samples, average value, highest and lowest vales of the data model. The variability of the data is also described from the variance and standard deviation described in the statistics.

3.5.5 Panel – regression

This research uses panel-data regression to analyze the collected data, meaning that the time differences of the data won't be considered in the analysis. There are two models that can be implemented in this panel-data regression analysis, fixed effects (FE) model and random effect (RE) model. To decide which model to use, the Hausman test will be performed.

Considering the two models for the analysis, the estimated possible models are as below:

Fixed Effect (FE) Model

$$ROA_{it} = \beta_0 + \beta_1 INV_{it} + \beta_2 ACP_{it} + \beta_3 APP_{it} + \beta_4 CCC_{it} + \beta_5 WC_{it} + \mu_{it}$$

Or ***Random Effect (RE) Model***

$$ROA_{it} = \beta_0 + \beta_1 INV_{it} + \beta_2 ACP_{it} + \beta_3 APP_{it} + \beta_4 CCC_{it} + \beta_5 WC_{it} + \varepsilon_{it} + \mu_{it}$$

Description: 　ROA 　: Return on Assets

CCC 　: Cash Conversion Cycle

INV 　: Number of Days Inventory

ACP 　: Average Collection Period

APP 　: Average Payment Period

WC 　: Working Capital