

Chapter 3

Research Methodology

This chapter outlines the research methodology used to test hypotheses formulated in Chapter 2. First, the sample selection and data collection are explained in Section 3.1. The definitions and measurements of all variables are described in Section 3.2 and finally, data analysis is discussed in Section 3.3.

3.1 The sample selection and data collection

This research aims to examine the specific firm characteristics that influence financing decisions of public companies listed on the Stock Exchange of Thailand (SET) for the time period 2005 - 2007. According to industry classification by SET, Thai listed companies as a sample of the study are non - financial firms which are in the following industries:

1. Agro & Food industry	44 (companies)
2. Consumer products	41
3. Industrials	69
4. Property & construction	89
5. Resources	24
6. Services	85
7. Technology	<u>37</u>
Total	<u>389</u>

The study employs those populations (389 companies) as the sample for analysis. According to assumptions of multiple regression analysis which is used in this research, the study checks a number of sample firms (N) to predictors to avoid problems regarding a small effect size and substantial measurement error. The rule of thumb of multiple regressions requires N more or equal 50 plus 8m ($N \geq 50 + 8m$), where m is the number of independent variables (Tabachnick & Fidell 2001; Field 2005). Thus, following this rule, the number of sample firms for eight independent variables

(including one control variable) in the proposed regression model should be 114 firms ($50 + (8 \times 8)$), that is, 389 sample firms of the study are very sufficient for testing the proposed research model.

The data for study is collected from the SETSMART database of the Stock Exchange of Thailand (SET). The data includes three - year financial statements (income statement and balance sheet) and other related reports in FM 56 – 1 of 389 sample firms during the period 2005 - 2007.

3.2 Definitions and measurements of variables

Based on the hypotheses in Chapter 2, there are 9 variables in the study, one dependent variable, seven independent variables and one control variable. The definition and measurement of each variable, which is adapted from related prior studies, is presented as follows.

3.2.1 The dependent variable

Previous studies used leverage, which is total debt ratio (TDR), as a proxy of a firm's capital structure and financing decisions (e.g., Graham & Harvey, 2001; Mackay and Phillips, 2005; Mazur, 2007; Rao and Lukose, 2002; Wiwattanakantang, 1999). In line with previous studies, the measure of a firm's financing decisions in this present study is total liabilities (both short-term and long-term debt) over total assets, calculated with book and market values. The book value is defined as the book value of total liabilities divided by the book value of total assets. The market value is defined as the book value of total liabilities divided by the book value of total liabilities and the market value of total equity. The market value of total equity is defined as the number of outstanding shares multiplied by the market price per share at the last trading day of 2007. The formulae are:

$$\text{TDR - book value} = \frac{\text{Book value of total short-term and long-term liabilities}}{\text{Book value of total assets}}$$

$$\text{TDR - market value} = \frac{\text{Book value of total short-term and long-term liabilities}}{\text{Book value of total liabilities} + \text{Market value of total equity}}$$

3.2.2 Independent variables

The selection of explanatory variables in this research is based on two capital structure theories, namely the trade - off theory and the pecking order theory. The set of explanatory variables will include seven factors following the studies of prior research (e.g., Barclay, Smith and Watts, 1996; Cassar and Homes, 2003; Delcours, 2007; Eriotis, 2007; Mazur, 2007). These firm characteristics are firm size, liquidity, fixed assets, profitability, financial risk, dividend policy, and firm growth. The following is the definition and measurement of each variable.

3.2.2.1 Firm size (SIZE)

Firm size can be defined in different ways in terms of net revenues from sales, total sales, and the book value of total assets. Mazur (2007) used those definitions (net revenues from sales and total assets) to measure firm size. Eriotis (2007) considered total sales to be a proxy of firm size whereas Delcours (2007) employed the natural logarithm of total assets as its proxy. Gaud, Jani, Hoesli and Bender (2003), Titman and Wessels (1988) and Rajan and Zingales (1995) also employed the natural logarithm of total assets as a proxy of size. It seems the natural logarithm of total assets is the common proxy for size. Thus, in this study, firm size (SIZE) is defined as the book value of total assets in terms of the natural logarithm. The formula is:

$$\text{SIZE} = \text{Log} (\text{Book value of total assets})$$

3.2.2.2 Liquidity (LIQD)

As mentioned before, the majority of empirical research found liquidity being negatively correlated with debt ratios by using the current ratio as a proxy to measure the firm's liquidity (LIQD) (e.g., Cassar and Homes, 2003; Eriotis, 2007; Mazur, 2007). Thus, in line with those studies, liquidity (LIQD) in this study is defined as the current ratio. The formula is:

$$\text{LIQD} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

3.2.2.3 Fixed assets (FASST)

A large number of previous studies defined fixed assets (FASST) in terms of the ratio of net fixed assets or non-current assets divided by total assets (e.g., Barclay, Smith and Watts, 1996; Cassar and Homes, 2003; Chen and Strange, 2005; Rao and Lukose, 2002; Wiwattanakantang, 1999). Thus, following these studies, the ratio of net fixed assets to total assets is employed to measure fixed assets (FASST). The formula is:

$$\text{FASST} = \frac{\text{Net fixed assets}}{\text{Total assets}}$$

3.2.2.4 Profitability (PROF)

Previous studies define profitability (PROF) as the return on assets ratio (ROA). However, there are various types of the ratio. For example, Rao and Lukose chose the return on total assets which is calculated as the ratio of earnings before interest and tax to total assets, similar to the studies of Booth, Aivazian, Demircug-Kunt and Maksimovic (2001) and Rajan and Zingales (1995), whereas Akhtar (2005), Delcours (2007) and Eldomiaty (2007) used the ratio of earnings after taxes to total assets as a proxy for profitability. This study applies the measure of profitability from the Akhtar (2005), Delcours (2007) and Eldomiaty (2007) approach. The formula is:

$$\text{PROF} = \frac{\text{Earnings after taxes (EAT)}}{\text{Total assets}}$$

3.2.2.5 Financial risk (FRSK)

Harris and Raviv (1990) and Eriotis (2007) used financial risk (FRSK) in terms of the interest coverage ratio as an expected determinant of capital structure. It is expressed as net income before interest and taxes divided by interest payments. In line with these empirical studies, the definition of financial risk in this study is the interest coverage ratio which is calculated as earnings before interest and taxes divided by interest payments. The formula is:

$$\text{FRSK} = \frac{\text{Earnings before interest and taxes (EBIT)}}{\text{Interest payments}}$$

3.2.2.6 Dividend policy (DIVD)

Frank and Goyal (2004) and Martin and Scott (1974) used the payout ratio as a proxy of dividend policy to study its relationship with financial leverage. Mazur (2007) also employed dividend yield to measure dividend policy in his sample firms. The payout ratio was defined as dividend payments over net income. Thus, consistent with these studies, proxy used to measure dividend policy (DIVD) in the study is the payout ratio calculated in the same way. The formula is:

$$\text{DIVD} = \frac{\text{Dividend payments}}{\text{Earnings after Taxes}}$$

3.2.2.7 Firm growth (GROW)

There are various proxies used in the literature to measure firm growth. For example, Eriotis (2007) chose the annual change on earnings as a proxy of growth measurement of sample firms as whereas Cassar and Homes (2003) used the growth rate of net sales to capture firm growth. On the contrary of them, Delcoure, (2007), Mazur (2007) and Rao and Lukose (2002) used the growth rate of total assets to measure growth opportunities. In this study, firm growth (GROW) is defined as the growth rate of earnings after taxes. It is calculated by dividing the difference between earnings after tax of the current year and earnings after tax of the year prior to the current year by earnings after tax of the year prior to the current year. The formula is:

$$\text{GROW} = \frac{(\text{Earnings after taxes at } t - \text{Earnings after taxes at } t-1)}{\text{Earnings after taxes at } t}$$

All independent variable measures are summarized in Table 3.1.

Table 3.1: A summary of definitions and expected signs of independent variables

Variable	Expected sign	Definition
Firm size (SIZE)	+	The natural log of the book value of total assets
Liquidity (LIQD)	-	Current assets divided by current liabilities
Fixed assets (FASST)	-	Net fixed assets divided by total assets
Profitability (PROF)	-	EAT divided by total assets
Financial risk (FRSK)	-	EBIT divided by Interest expenses
Dividend policy (DIVD)	+	Dividends divided by EAT
Firm growth (GROW)	+	$(EAT_t - EAT_{t-1})$ divided by EAT_t

Notes: EAT = Earnings after taxes, EBIT = Earnings before interest and taxes,
TA = Total assets, t = Time

3.2.3 The control variable

Regarding a control variable, Eriotis (2007) suggested that the capital structures of firms which have debt more than equity were different from the market as a whole and this might affect the results of the study. Thus, to control this impact, the study follows the Eriotis (2007) approach and uses a dummy variable (1,0) that equals one if firms have the percentage of the total debt ratio greater than 50%, and zero if firms have the percentage of the total debt ratio less than 50%.

3.3 Data analysis

Two types of statistics including descriptive statistics and inference statistics will be employed for analysis. Descriptive statistics is the first tool of analysis to examine the basic features of sample firms and variables. Both numerical and graphical methods will be used to present each variable and combinations of variables in many forms such as tables and graphs. It will provide a useful summary for understanding a set of data. Inferential statistics such as bivariate correlation (Pearson's product-moment correlation coefficient) and the ordinary least squares regression analysis will be the second tool to

make estimations and predictions from samples to populations. They will be used to test hypotheses and the research model of the study. The statistical package of STATA (version 11.5) will be an instrument to analyze data and find the results.

The ordinary least squares regression model to investigate the relationship between firm characteristics and a firm's financing decisions can be expressed as follows.

$$\begin{aligned} \text{TDR} = & \alpha + \beta_1(\text{SIZE}) + \beta_2(\text{LIQD}) + \beta_3(\text{FASST}) + \beta_4(\text{PROF}) + \beta_5(\text{FRSK}) \\ & + \beta_6(\text{DIVD}) + \beta_7(\text{GROW}) + \beta_8(\text{DUMYDR}) + \varepsilon \end{aligned}$$

Where as;

α = A constant term

$\beta_1 \dots \beta_8$ = Coefficient of each variable

ε = An error term

TDR = Total debt ratio

SIZE = Firm size

LIQD = Liquidity

FASST = Fixed assets

PROF = Profitability

FRSK = Financial risk

DIVD = Dividend policy

GROW = Firm growth

DUMYDR = A dummy variable for firms which have total debt ratio greater than 50%

3.4 Summary

This chapter introduced research methodology for the study. It is designed to examine the relationship between specific firm characteristics (firm size, liquidity, fixed assets, profitability, financial risk, dividend policy and firm growth) and a firm's capital structure as measured by total debt ratio.

All sample firms (389 companies) are publicly non - financial firms listed on the Stock Exchange of Thailand (SET). The data for analysis is obtained from income statement, balance sheet and other related information in FM 56 - 1 of the companies. The study gathers the data from the SETSMART database of the Stock Exchange of Thailand (SET) at the time period 2005 - 2007. A summary of the definitions and measurements of independent variables are outlined in Table 3.1. Descriptive statistics is used to examine the basic features of sample firms and variables whereas the ordinary least squares regression model is employed to test hypotheses in chapter 2.

The next chapter presents the results of the descriptive analysis and statistical test of hypotheses. A report of the tests of the statistical assumptions is also described in this chapter.