The Impact of Micro and Macro Environment on Profitability of Technology Companies in Thailand

Doma Rema Marak, and Sirion Chaipoopirutana

***Abstract*—**This study aims to investigate the impact of micro environment in terms of assets, capital, debt and liquidity and macro environment in terms of gross domestic product (GDP) and inflation on profitability in terms of return on assets (ROA) and return on equity (ROE) of technology industry of Thailand from 2003 to 2012. The multiple regression analysis has been employed to analyze the impacts of independent variables on dependent variable. The study results have shown that debt and GDP have an impact and statistically significant on ROA. Debt has been shown to have a negative impact on ROA and on the other hand, GDP has a positive impact on ROA. Thus, the findings of this study indicated that debts and GDP are important factors that have been affecting the profitability of the technology companies of Thailand.

***Keywords*—** Assets, Capital, Debts, Inflation, GDP, Liquidity, Profitability, Return on Assets, Return on Equity.

I. Introduction

A firm's profitability is generally regarded as an important precondition for long term firm survival and success and also effects its economic growth, employment, innovation and technological change (Yazdanfar, 2013) [26]. Further, Hofstrand (2009) [12] also stated that measuring profitability is the most important measure of the success of a business. A business that is not profitable cannot survive and a business that is highly profitable has the ability to reward its owners with a large return on their investment.

In addition, return on assets influenced the profitability of a firm by expressing the company's ability to generate profit as a consequence of the productive use of resources and efficient management (Burja, 2011) [6], likewise, return on equity influenced the profitability of a firm by measuring the profitability of equity funds invested in the firm by shareholders (Chandra, 2008) [7].

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II. Literature Review

A. Assets

Juneja *et al.* (2001) [14] defined an asset as anything of use to future operations of the enterprise and belonging to the enterprise. Assets have a significant role in determining the role and the profit ratio of a firm (Smith, 1980) [25].

B. Capital

Mueller and Siberon (2004) [17] defined capital as the amount of capital that companies set aside as a buffer against potential losses from their business activities. Haron (1996) [10] concluded from his study that capital adequacy, total expenses and liquidity show a statically significant effect on profitability.

C. Debts (Loan)

Debt is a firm's total liabilities (Ebert and Griffin, 1998) [9]. Athanasoglou *et al.* (2005) [2] found that credit risk is negatively and significantly related to profitability.

D. Liquidity

According to Chandra (2008) [7], a firm's liquidity refers to its ability to meet its obligations in the short run which is usually a period of one year. Haron (1996) [10] concluded from his study that liquidity shows a statistically significant effect on the profitability.

E. GDP

According to Hill (2009) [11], GDP is the market of a country's output attributable to factors of production located in the country's territory. Bikker and Hu (2002) [4] found a positive relationship between gross domestic product growth and profitability.

F. Inflation

Inflation can be defined as a sustained or continuous rise in the general price level (Labonte, 2011) [15]. In addition, in the study of Ayadi and Boujelbene (2012) [3] it was noticed that the relationship between inflation and profitability is negative.

G. Return on Asset

The return on assets provides information about how much profits are generated on average by each unit of assets; therefore it is the indicator on how efficiently a company is

http://dx.doi.org/10.15242/ICEHM.ED1014055

being run (Petersen and Schoeman, 2008) [21]. In short, return on assets is the ratio of net income to total assets (Brigham and Ehrhardt, 2002) [5].

H. Return on Equity

According to Pinches (1990) [23], return on equity provides an accounting-based indication of how effective management is from stockholders' point of view. Damodaran (2007) [8] stated that the return on equity focuses on just the equity component of the investment. Philippatos and Sihler (1991) [22] return on equity is defined as: Return on Equity (ROE) = Net Income / Owners' Equity.

III. Research Framework

Figure.1. shows the conceptual framework of this study to give a better view of the relationships.

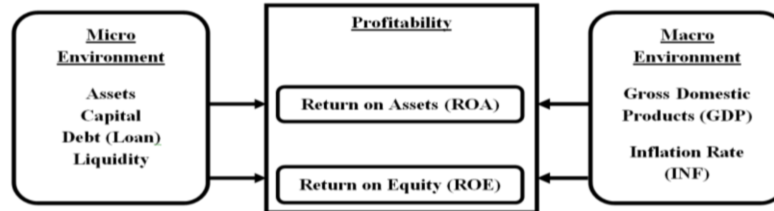

Fig. 1 The impact of micro and macro environment on profitability of technology companies in Thailand

According to the Fig. 1 there are four independent variables under the micro environment factor, namely; assets, capital, debt and liquidity. There are two independent variables under the macro environment factor, namely; GDP and inflation. There are two dependent variables under profitability, namely; ROA and ROE.

In this research, a total of four hypotheses are developed for the study and they are shown as follows:

H1a: The micro environment in terms of assets, capital, debt (loan) and liquidity has an impact on profitability in terms of return on asset (ROA).

H2a: The macro environment in terms of gross domestic products (GDP) and inflation rate (INF) has an impact on profitability in terms of return on asset (ROA).

H3a: The micro environment in terms of assets, capital, debt (loan) and liquidity has an impact on profitability in terms of return on equity (ROE).

H4a: The macro environment in terms of gross domestic products (GDP) and inflation rate (INF) has an impact on profitability in terms of return on equity (ROE).

IV. Research Methodology

A. Research Methods

The methods of research used are divided into two parts which consists of types of research or techniques and research method. In types of research, causal research is employed in this study and in the research method, secondary data or sources are used for this study.

B. Target Population and Sample Size

The target population of this study focuses on thirty nine technology companies of Thailand that are listed on the Stock Exchange of Thailand for one decade, which is the ten years from 2003 to 2012. This includes eleven electronic component companies and twenty eight information and communication technology companies.

In this study, thirty companies are chosen as samples. Therefore summing up the data of thirty companies for ten years the researcher gathered three hundred as the sample size. The equation is given below:

1 Company for 10 Years (1 x 10) = 10 Data

30 Companies for 10 Years (30 x 10) = 300 Data

C. Data Collection

The main sources for this study are annual reports of the thirty technology companies of Thailand which are listed on the Stock Exchange of Thailand. The annual reports of the thirty selected companies were taken from Morningstar and Bloomberg. The other sources for this study are from some useful websites, articles, journals, textbooks and previous research.

D. Statistical Treatment of Data

The statistical model used in this study includes descriptive statistics and multiple regression analysis. The multiple regression equation is written as:

$$\hat{Y} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \ldots\ldots\ldots + \beta_n X_n + \epsilon$$

Where;

$\hat{Y}$ = Dependent Variables.

β_0 = Estimated intercept of the y axis.

β_1, β_2, β_3 and β_4 = Regression coefficient with independent variable.

X_1, X_2, X_3 and X_4 = Independent variables.

ϵ = Error available.

In this study, the researcher used four multiple regression models. Therefore, the multiple regression model of each hypothesis is written as:

The equation of hypothesis one is written as:

$$ROA = \beta_0 + \beta_1 ASSETS_1 + \beta_2 CAPITAL_2 + \beta_3 DEBT_3 + \beta_4 LIQUIDITY_4 + \epsilon$$

The equation of hypothesis two is written as:

$$ROA = \beta_0 + \beta_1 GDP_1 + \beta_2 INFLATION_2 + \epsilon$$

The equation of hypothesis three is written as:

$$ROE = \beta_0 + \beta_1 ASSETS_1 + \beta_2 CAPITAL_2 + \beta_3 DEBT_3 + \beta_4 LIQUIDITY_4 + \epsilon$$

The equation of hypothesis four is written as:

$$ROE = \beta_0 + \beta_1 GDP_1 + \beta_2 INFLATION_2 + \epsilon$$

V. FINDINGS

The researcher implied descriptive statistics and multiple regression analysis to study the research objectives. After the four hypotheses are analyzed and tested by using multiple regression analysis. The summary of all the tested results are shown in Table I:

TABLE I
SUMMARY OF DESCRIPTIVE STATISTICS

	Mean
ROA	3.1944
ROE	-2.3625
ASSETS	22.3598
CAPITAL	22.0673
DEBT	19.2311
LIQUIDITY	13.131
GDP	4.27
INFLATION	3.078

According the descriptive statistics in Table I, the technology industry of Thailand is generating 3.2% profit of what they have invested in the assets. However, the technology industry of Thailand could not generate positive returns on equity by losing -2.4%. The technology industry of Thailand accumulated 22.4 assets and 22.1 capital during the period of 2003 to 2012. They also borrowed 19.2 debt during 2003 to 2012. The technology industry maintained 13.1% of liquidity level. GDP has shown an average of 4.3%, and inflation has shown an average of 3.1%, which is slightly above the average.

TABLE II
SUMMARY OF HYPOTHESES RESULTS

Hypotheses	Significant Value (alpha)	Beta (β) Value	Result
$H1_o$: The micro environment in terms of assets, capital, debt and liquidity has no significant impact on profitability in terms of ROA.			
· Assets	0.906	-0.403	Failed to reject
· Capital	0.421	2.673	Failed to reject
· Debts	0.009	-0.590	Reject H_o
· Liquidity	0.166	0.002	Failed to reject
$H2_o$: The macro environment in terms of GDP and Inflation has no significant impact on profitability in terms of ROA.			
· GDP	0.017	0.952	Reject H_o
· Inflation	0.074	-1.301	Failed to reject
$H3_o$: The micro environment in terms of assets, capital, debt and liquidity has no significant impact on profitability in terms of ROE.			
· Assets	0.705	13.21	Failed to reject
· Capital	0.932	2.910	Failed to reject
· Debts	0.335	-2.212	Failed to reject
· Liquidity	0.972	0.000	Failed to reject
$H4_o$: The macro environment in terms of GDP and Inflation has no significant impact on profitability in terms of ROE.			
· GDP	0.087	6.910	Failed to reject
· Inflation	0.212	-9.196	Failed to reject

Based on the results of hypothesis one, the researcher found that, assets have a negative impact and are statistically insignificant on ROA. Thus, ROA reflects that larger the assets size, there is lower ROA. This result is consistent with the results of previous studies of Horne and Wachowicz (2004) [13] who found that assets have a negative impact on profitability. The capital has a positive impact and is statistically insignificant on ROA. Thus, it indicated that when total capital increases, ROA also increases. This result is consistent with the results of previous studies of Qureshi and Yousaf (2014) [24] who found capital positively and statistically not significant on profitability. The debt has a negative impact and is statistically significant on ROA. This indicated that the more debt the company has, there is a significant decline of ROA. This result is consistent with the results of previous research of Molyneux and Thornton (1992) [16] who found that debt has negatively and significantly impacts on profitability. The liquidity has a very low positive impact and is statistically insignificant on ROA. Thus, it indicated that when there is an increase or decrease in liquidity level, ROA changed only 0.002, which a very low change rate. This result is consistent with the previous study of Qureshi and Yousaf (2014) [24], who found a positive impact on profitability but insignificant.

http://dx.doi.org/10.15242/ICEHM.ED1014055

Based on the result of hypothesis two, the researcher found that, GDP has a positive impact and is statistically significant on ROA. This indicated that, the higher the economic growth the higher the profitability of the firms. This result is consistent with the results of previous studies of Bikker and Hu (2002) [4] who found GDP has a positive impact and is statistically significant on profitability. The inflation has a negative impact and is statistically insignificant on ROA. Thus, it indicated that, higher the inflation rate the lower the profitability of the firms. This result is consistent with the results of previous studies of Ayadi and Boujelbene (2012) [3] who found negative impacts on profitability.

Based on the result of hypothesis three, the researcher found that, assets have a positive impact and are statistically insignificant on ROE. ROE reflects that the higher the assets size, the higher the ROE. This result is consistent with the results of previous studies of Paradogonas (2007) [20] who found a positive impact on profitability. The capital has a positive impact and is statistically insignificant on ROE. Thus, it indicated that, higher the capital the higher the ROE of the firms. This result is consistent with the results of previous study of Qureshi and Yousaf (2014) [24] who found capital positively and statistically not significant on profitability. The debt has a negative impact and is statistically insignificant on ROE. Thus, it indicated that, higher the debt the lower the ROE of the firms. This result is consistent with the results of previous research of Asma *et al.,* (2011) [1] who found that debt has an impact and statistically insignificant on profitability. The liquidity has no impact and statistically is insignificant on ROE. Thus, there is no change on ROE. This result is consistent with the previous study of Nunes *et al.,* (2009) [19] who found a neutral relationship of liquidity with firm's profitability.

Based on the result of hypothesis four, the researcher found that, GDP has a positive impact and is statistically insignificant on ROE. Thus, it indicated that when GDP is high, the profit margin of ROE is also high. This result is consistent with the results of previous studies of Naceur and Goaid (2005) [18] who found GDP insignificant. The inflation has a negative impact and is statistically insignificant on ROE. Thus, it indicated that, higher the inflation rate the lower the profitability of the firms. This result is consistent with the results of previous studies of Ayadi and Boujelbene (2012) [3] who found a negative impact on profitability.

VI. Conclusion

The study has been conducted on thirty technology companies of Thailand which are listed on the Stock Exchange of Thailand (SET) for the period of one decade which is from 2003 to 2012. The technology industry in Thailand is made up of two main sectors. There are eleven electronic component sectors and twenty eight companies from the information and communication technology sector. However, the researcher could use only nine electronic component companies and twenty one information and communication technology companies. The researcher employed the multiple regression analysis to test all the hypotheses. The results of the hypotheses concluded that debt and GDP had an impact and is statistically significant on profitability in terms of ROA only. Despite being insignificant, the micro environment variable like assets, capital and liquidity have an impact on ROA where as liquidity has no impact on ROE, except assets, capital and debt. Furthermore, the macro environment variables GDP and inflation both have an impact on ROE despite being insignificant and inflation has an impact and is statistically insignificant on ROA also.

VII. Recommendation

Based on the results of the descriptive analysis, the researcher would like to recommend to the investors that companies in the technology industry of Thailand are risky to invest during global crisis, especially in a financial crisis, political crisis, war and natural calamities. However, investors could invest by opting for the companies whose ROA and ROE is highly profitable.

Based on the results of hypothesis one, the technology companies should reduce its dependency on short term debts while inflation rate is high and take advantage of low interest rates. Reduce acquiring assets during global crisis. Companies should choose the best financial resources, whether to depend on short term debt or long term debt or equity to maintain their capital during the crisis.

Based on the results of hypothesis two, the companies should increase their liquidity level by increasing cash reserve to operate boldly during global crisis. When inflation is low, companies should take advantage of low interest rates.

Based on the result of hypothesis three, the investor should invest in the companies whose capital is increasing and whose debt level is decreasing or rising slightly by assessing the total assets of the firms and capital size.

Based on the results of hypothesis four, investors should not invest in this industry in Thailand during global crisis because the market is quickly and highly vulnerable to the crisis, especially, when GDP is low and there is deflation.

VIII. Further Study

Future studies should include more factors because there are many other factors that affect profitability of the firms. Future studies should expand the scope of study to different sectors and countries to make the results of the study more relevant. Future studies should investigate the profitability for longer periods of time or for different market situations to make the results of the study more relevant. Comparative future research on the factors affecting profitability of technology companies and other companies needs to be conducted both domestically and internationally.

Acknowledgment

In the long and enthusiastic journey of completing this research work, I am indebted to so many people's kind and generous assistance, support and encouragement. I would like to express my sincere gratitude to my advisor, Dr. Sirion Chaipoopirutana for her continuous supervision, advice and guidance. She has shown the utmost patience with me, listened to me and gently corrected and pushed me whenever it was required and gave me total freedom in executing this study.

Her ready availability and quick response helped me to complete this study.

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