

## Technology Industry on Financial Ratios and Stock Returns

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**Abstract:** The objective of this study is determining the significant relationship between financial ratios and stock returns in technology industry of the Stock Exchange of Thailand (SET) from year 1997 to 2011 for 15 years (quarterly data from financial statement). Five financial ratios from each category are used as sample of dependent variables; current ratio from liquidity ratio, debt-to-equity ratio from debt ratio, inventory turnover ratio from asset activity ratio, return on equity ratio from profitability ratio, and price-earnings ratio from market value ratio. Ordinary Least-Squares Regression (OLS estimate) to test the relationship between financial ratios and stock returns and found that only ROE and PE have a significant relationship with stock returns. In conclusion, from previous studies and this study showed that different countries and different methodology in testing the relationship causes different results.

**Key words:** financial ratios; stock returns; technology industry

**JEL codes:** G10, G11, L00

### 1. Background of the Study

To know the financial characteristics of companies would be helpful for those who like to understand the different between them and to provide information like analyst consensus before investors make a decision to buy or sell stocks. Stickel (1995), Lang and Lundholm (1996), and Barber, Lehavy, McNichols and Trueman (1998) mentioned that the recommendation and the company performance have the relationship with stock returns; however, different analyst can make the different opinion and consensus. According to Australian Shareholders' Association also mentioned that financial ratio analysis offers and the most logical set of indicators for a sharemarket investor. That is why investors should find and analyze financial ratios by themselves then compare with consensus from analysts in order to avoid mislead from unpublished company information as rumors and perceive desirable return (Gao & Oler, 2011). Furthermore, this study focuses only on technology industry; which is one of the most important fundamental of country development, and Thailand need to gain more sufficient resources like R&D and new technologies that can obtain higher level of potential to compete against ASEAN Economic Community (AEC) for taking opportunities to be offered in the near future by the AEC (BOI, 2012). So, this research determines the relationship between some financial ratios of five categories financial ratios; which are Profitability ratios, Liquidity ratios, Debt ratios, Asset activity ratios, and Market value ratios to the stock returns of

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Technology industry in Stock Exchange of Thailand (SET) from the year of 1997 to year 2011.

According to chapter 1, the rest of chapters are organized as following; in chapter 2 shows the previous literature review of the relationship between financial ratios and stock return. In chapter 3 shows the methodologies applied in the previous studies to finding the relationship between financial ratios and stock returns. In chapter 4 contributes the presentation and critical discussion of results. In chapter 5 provides the conclusion, discussion, and recommendations for further research.

This study would like to acknowledge investors, managers and lenders in forecasting financial health from five financial ratios in technology industry of SET in order to receive desirable or higher returns. For investors, the benefit is to help selecting the proper financial ratios on predicting the stock price to minimize their loss and to perceive desirable gain. Furthermore managers can get benefits on monitoring and reviewing the operation in case there is inconsistency between financial ratios and stock returns. Also, the lenders can use for supporting a decision whether they should to renew company's loan or not.

## **2. Review of Related Literature and Studies**

There are many papers studied the relationship between financial ratios and stock returns in each country and the result of empirical study showed that some countries can but some countries cannot as follow. Martani, Mulyono, and Khairurizka (2009) mentioned that financial ratios including profitability, turnover and market ratio have significant impact to the stock return during year 2003-2006 in Indonesia Stock Market. Kheradyar, Ibrahim, and Mat Nor (2011) found the relationship between financial ratios and stock return in the Malaysia Stock Exchange. Aono and Iwaisako (2011) found that the performances of predicting the stock return for Japanese financial ratios are weaker than US financial ratios such as price-earnings ratio and price-dividend ratio. In Thailand, Tantipanichkul and Supattarakul (2010) suggested that investors can use publically available, historical accounting information to choose stocks and earn abnormal stock returns because they agree that Thai stock markets are not semi-strong form efficient.

### **2.1 Definition and Features of the Independent Variables**

#### **2.1.1 The Relationship between the Current Ratio (CR) and Stock Returns**

Current ratio (CR) measures the assets that will turn into cash within one year compare with the liabilities that must be paid within one year (Higgins, 2009). Choi and Sias (2012) stated that an increase in liquidity; as current ratio, can forecast the higher stock returns. Martini, Milyono, and Khairurizka (2009) analyzed that current ratio has negative relationship with stock returns from the year 2003 to year 2006 in listed manufacturing companies of Indonesia Stock Market. On the other hand, Khan (2012) mentioned current ratio has no influence on stock returns at 12 textile manufacturing companies in the period of 2003 to 2009 in Pakistan Stock Exchange.

#### **2.1.2 The Relationship between Inventory Ratio (INTO) and Stock Returns**

Inventory turnover (INTO) measures how many times the assets is turned over within one year. Brigham and Houston (2010). Alan, Gaur, and Gao (2011) found the positive relationship between Inventory turnover and stock returns because high inventory productivity is a strong predictor of future stock returns of listed U.S retailers. Conversely, Chen, Frank, and Wu (2007) analyzed that the extremely low inventory firms follow by the highest returns for U.S. retailers while the medium inventory firms follow by the highest returns for U.S. wholesalers between 1981 and 2004. While Omran and Ragab (2004) mentioned there is no relationship between inventory turnover and stock return.

### 2.1.3 The Relationship between Debt to Equity Ratio (D/E) and Stock Returns

Debt to equity (D/E) measures the financial leverage by comparing book value of company's liabilities to book value of equity (Higgins, 2009). Sari and Hutagaol (2012) found the positive relationship between debt to equity ratio and stock returns of food and beverage companies on the Indonesian Stock Exchange during year 2003 to 2008. Moreover Tripathi (2008) also found that debt to equity ratio have statistically significant positive relationship with stock returns in Indian Stock Market over the period June 1997 to June 2007. Conversely, Richardson and Sloan (2003) found the negative relationship external financing and stock returns as a result of over-investment and aggressive accounting. However Rahmani, Sheri, and Tajvidi (2006) mentioned there is no relationship between debt to equity ratio and stock returns in Tehran Stock Exchange (TSE) since 1997 to 2003.

### 2.1.4 The Relationship between Return on Equity (ROE) Ratio and Stock Returns

Return on equity (ROE) measures the efficiency of a company in term of earning per dollar of invested equity capital or percentage return to owners on investment (Higgins, 2009). Elleuch (2009) mentioned ROE has the predictive power to future stock returns and future earnings performance so ROE could be explained by the higher profitability of these firms for the period 1993 to 2001 in Tunisia same as Omran and Ragab (2004) studied the relationships between common financial ratios and stock returns in Egyptian stock market from 1996 to 2000 as the result show that ROE seems to play a significant role in investment decision. Whereas Haddad (2012) examined that there is insignificant relationship between Return on Equity (ROE) and stock returns from the year 2000 to 2009 in 15 Jordanian banks listed in Amman Stock Exchange (ASE).

### 2.1.5 The Relationship between Price to Earnings Ratio (P/E) and Stock Returns

Price to earnings ratio (P/E) measures how much investors are willing to pay per dollar of reported profit (Brigham & Houston, 2010). Fairfield (1994) found that P/E is positively correlate with stock returns because the earnings are expected to increase in the future will have high P/E ratios. Shen (2000) mentioned there is a negative relationship between price to earnings ratio and stock returns from year 1970 to year 2000 in S&P 500 Index since very high price to earnings ratios have usually followed by poor stock returns. Basu (1977) explained that returns on stock with low P/E ratios tend to earn higher rate of return than high P/E ratio in NYSE between September 1956 and August 1971. Khan (2009) found that the stock returns are statistically insignificant with P/E ratios.

## 2.2 Discussion of the Dependent Variables

This study determines stock returns as dependent variable from financial ratios as independent variables because this study needs to help investors gain actual return more than or equal their expected return. Al-Rawashdeh (2009) mentioned that the Malaysian stock market can be predicted by financial ratios or stock return has a necessary in interpretation the company's stock value and investment returns to investors and business organization. Moreover Lewellen (2004) mentioned that financial ratios can measure the stock return. In addition, Dutta, Bandopadhyay, and Sengupta (2012) stated that various financial ratios significantly affect the stock return on the Indian stock market.

## 2.3 Empirical Review on Methodology

Stefanis (2005) used an Ordinary Least Square (OLS) regression analysis to Chairatanawan (2008) determine the relationship between financial ratios and stock returns in financial sector from the year 2000 to year 2005 and also provided BLUE of regression parameter to reduce variability. Moreover Campbell and Yogo (2006) used OLS to predict the stock returns by financial ratios such as dividend-price ratio, the earnings-price ratio, and interest rate. In Thailand, used an Ordinary Least Square Regression model examined the relationship between

financial ratios and the rate of return of samples stock return which performed in the statistical software.

### **3. Research Methodology**

This study has research objective to determine the relationship between CR, INTO, D/E, ROE, and PE and quarterly stock returns of technology industry in SET from 1997 to 2011. The collected data is time series for 15 years time and use OLS regression to test the relationship between financial ratios and stock returns quarterly. All collected time-series data need to be checked basic assumptions before testing the relationship between financial ratios and stock returns by Ordinary Least Square in order to avoid the problems such as Unit root test, Multicollinearity problem, Heteroscedasticity problem, Autocorrelation problem, and Specification errors. Stefanis (2005) tested the relation between price-to-earnings and stock returns in the Athens Stock Exchange based on OLS regression analysis by using cross-sectional regression to estimate the relationship between financial ratios and stock returns in financial sector from the year 2000 to year 2005.

### **4. Discussion**

#### **4.1 Data Series Stationarity Testing**

The stock returns and the five financial ratios for all 22 selected stocks in the technology industry were tested for stationarity. The Augmented Dickey-Fuller test statistic shows that all tested variables have no unit root as below.

**Table 1 Augmented Dickey-Fuller Test Statistic**

Variable	t-stat value	One tail Probability (p-value < 0.05) at 95% confidence level
RETURN	-18.32811	0.0000
CR	-4.933231	0.0000
INTO	-4.554846	0.0002
DE	-4.742992	0.0001
ROE	-9.264091	0.0000
PE	-4.742992	0.0001

The above Augmented Dickey-Fuller test statistic represents t-stat value of return (RETURN), current ratio (CR), inventory turnover (INTO), debt to equity (DE), return on equity (ROE), and price to earnings (PE) are -18.32811 (p-value = 0.0000), -4.933231 (p-value = 0.0000), -4.554846 (p-value = 0.0002), -4.742992 (p-value = 0.0001), -9.264091 (p-value = 0.0000) and -4.742992 (p-value = 0.0001) respectively. The p-value of all data are stationary at 95% confident level and all variables have no unit root. They do not need to make stationary in the first difference and second difference since all data were naturally stationary before conducting the regression analysis. An example of the result of this test can be seen in Appendix A.

#### **4.2 Normality Testing**

The values of skewness and kurtosis would be used to determine the normality of data. After conducting the statistical analysis, the values of skewness and kurtosis for each company and the industry in total is shown in the tables below:

**Table 2 Skewness and Kurtosis to Determine Normality of Each Company**

Stock	Skewness						Kurtosis					
	Cr	De	Into	Pe	Roe	Return	Cr	De	Into	Pe	Roe	Return
Advance	1.01	0.63	-0.06	1.02	-0.26	5.67	3.14	2.24	2.07	4.88	3.52	34.72
Ait	0.34	-1.43	0.23	1.32	-0.38	4.62	2.25	5.09	3.51	5.98	2.15	25.37
Ccet	0.78	-0.03	0.40	-1.55	-1.09	2.05	3.02	2.59	2.14	5.20	4.08	11.66
Csl	0.30	0.10	0.21	2.00	0.46	4.23	1.75	1.95	1.63	7.74	1.95	22.16
Ctw	0.68	-0.51	0.08	0.43	-0.96	4.08	3.14	3.29	2.92	2.15	3.02	21.50
Delta	-1.05	0.20	0.29	0.19	-1.25	5.26	4.55	1.78	2.68	3.72	4.42	31.63
Draco	0.00	-0.40	0.31	-0.10	-1.71	0.86	2.22	2.95	1.96	4.26	7.71	4.69
Eic	0.30	-0.08	0.42	0.23	-0.79	2.60	2.02	2.18	1.73	2.40	2.42	11.40
Intuch	-0.31	-0.18	1.77	3.14	0.45	4.60	3.30	2.86	6.00	16.71	4.04	25.74
It	0.50	-0.25	-0.53	0.27	0.07	1.02	2.47	2.34	3.18	3.68	3.09	4.87
Kye	0.00	0.02	-0.60	0.83	-1.51	5.22	1.85	2.34	2.38	3.68	5.50	30.85
Metco	0.41	-0.21	-0.07	3.04	-2.15	5.44	2.59	2.12	1.95	12.66	8.30	32.70
Mfec	1.20	-1.10	0.14	0.46	-0.39	-0.06	3.74	3.13	2.40	2.64	2.41	1.88
Mida	0.79	0.16	-0.08	0.73	-0.22	4.23	3.27	3.33	1.37	2.98	1.80	21.82
Samtel	1.54	-1.18	0.28	0.61	-0.04	0.44	4.75	3.40	3.13	2.28	1.90	4.01
Sim	1.49	-0.17	0.30	2.18	-0.36	1.85	6.01	2.73	2.05	9.54	1.63	9.54
Sis	-0.09	-0.12	-0.23	0.33	-0.80	2.91	1.69	1.80	2.46	3.10	3.45	13.65
Snc	-0.23	0.22	0.80	0.60	-1.08	1.09	1.98	2.05	2.67	2.61	3.09	5.58
Sppt	-0.06	0.08	0.56	1.54	-1.05	2.74	1.84	2.43	3.00	4.29	2.91	12.66
Team	0.04	0.55	0.00	1.98	-0.32	-0.05	2.13	3.25	2.40	6.66	2.90	2.86
Tks	-1.75	-0.85	-3.57	0.95	-0.89	3.64	5.47	2.12	17.01	4.15	4.78	18.09
Twz	1.29	-1.03	0.66	0.96	-0.83	-0.08	3.24	2.84	2.04	3.24	2.45	4.72

**Table 3 Skewness and Kurtosis to Determine Normality of Technology Industry**

Skewness						Kurtosis					
CR	DE	INTO	PE	ROE	RETURN	CR	DE	INTO	PE	ROE	RETURN
1.30	-1.04	-0.59	1.21	-1.35	3.78	10.23	7.11	5.41	6.37	6.05	32.72

The table above shows that return has the highest value of skewness and kurtosis. After comparison of the values of skewness and kurtosis for each firm and the industry, on the average, the values of each firm and industry could be describe as normal because the values of skewness and kurtosis are closed to (not far away from) zero so the bias in econometric analysis results resulting from the non-normality of data would not be encountered in this research paper.

**4.3 Problem Testing for Heteroscedasticity, Autocorrelation, and Misspecification**

The characteristic of time series data are normally encounter the problem of Heteroscedasticity, Autocorrelation, and Misspecification. In order to confirm that the data has no biasness and all setting hypothesis are true, problem testing are necessary to process before analyzing OLS regression.

**Table 4 Problem Testing for Heteroscedasticity, Autocorrelation and Misspecification**

	Problem Testing	p-value (>0.05)
Heteroscedasticity	White test	0.216642
Autocorrelation	Arch LM test	0.997769
	Serial Correlation LM test	0.067827
Misspecification	Ramsey RESET test	0.188961

These problem testing were carried out to determine if there is any biasness arising from Heteroscedasticity, Autocorrelation and Misspecification. The White test, the Arch LM, the Breusch-Godfrey Serial Correlation LM test and Ramsey RESET test were conducted. The White test is used to test Heteroscedasticity which is the variable in error term since an assumption of OLS is that error term must be equal. Results after test show that there was no problem of Heteroscedasticity, The Arch LM and Breusch-Godfrey Serial Correlation LM tests were used to test for autocorrelation which is the correlation of a value with its lag value. Results after test show that there was no problem of Autocorrelation. The Ramsey RESET test was conducted to test for misspecification of the equation. An OLS assumption is that the equation or model must be linear. Results after test show that there was no problem of Misspecification. From the table above shows p-value of Heteroscedasticity, Autocorrelation and Misspecification testing are higher than 0.05. This implies that there is no biasness of the regression result resulting from the above mentioned problems.

#### 4.4 Regression Analysis

After conducting the OLS regression between stock return (dependent variable) and the five financial ratios (independent variables) to determine their relationship, the result of the analysis is shown below. The result includes the coefficient of the financial ratios ( $\beta$ ) and the signs of their relationship to stock returns in that quarter.

**Table 5 Coefficient and Relationship between Stock Return of Industry and Financial Ratios**

Stock Return	Coefficient of $\beta$					Relationship				
	CR	DE	INTO	PE*	ROE*	CR	DE	INTO	PE	ROE
Technology industry	0.026	0.009	0.006	0.043	0.047	+	-	+	+	+

Note: \* = significant at 0.05 confidence level.

From Table 5 above, CR, DE, and INTO were insignificant with quarterly stock return in the Technology industry of the stock exchange of Thailand. They have no relationship with stock returns. The CR ratio result of this research paper tends to supports Khan (2012) mentioned that current ratio has no influence on stock returns. The INTO ratio result of this research paper tends to supports Omran and Ragab (2004) mentioned that inventory turnover has no relationship with stock returns. The DE ratio result of this research paper also supports Rahmani, Sheri, and Tajvidi (2006) mentioned that there is no relationship between debt to equity ratio and stock returns. Meanwhile PE and ROE showed significant amount on quarterly stock return of the industry at 0.05 confidence level. Since the significant results are only considered, the significant values of PE and ROE were estimated. The estimated equation of regression is thus:

$$R_t = -0.032 + 0.043PE$$

$$R_t = -0.039 + 0.047ROE$$

The equations above show the significant relationship between PE and ROE to quarterly stock return. The equation shows the PE and ROE ratio is positively related to quarterly stock return.

**Table 6 The Coefficient of Determination (R-square) and Adjusted Coefficient of Determination (Adj. R-square)**

Stock Return	Coefficient of determination (R-Square)					Adjusted coefficient of determination (Adj. R-Square)				
	CR	DE	INTO	PE**	ROE*	CR	DE	INTO	PE**	ROE*
Technology industry	0.0031	0.0006	0.0003	0.0094	0.0147	0.002	-0.0005	-0.0007	0.0084	0.0136

Note: \* = the highest significance; \*\* = the second highest significance.

From Table 6, the highest coefficient of determination (R-Square) and adjusted coefficient of determination (Adjusted R-Square) are shown; ROE ratio and PE ratio have the highest predictive power respectively. Note that the stock return is the quarterly stock return in the technology industry of the stock exchange of Thailand.

## 5. Conclusion and Summary of the Findings

To answer the research questions are obtained from an analysis of Ordinary Least Square method to determine the relationship between five financial ratios; current ratio, inventory turnover, debt-to-equity ratio, return on equity ratio, and price-to-earnings ratio, and stock returns of technology industry in the Stock Exchange of Thailand during year 1997 to 2011. From the OLS regression analysis reveals the results that only ROE and PE are positively related to stock returns at the 95% confidence level. Statistically, ROE has more significance than PE if observing from the coefficient of determination (R-Square) and adjusted coefficient of determination (Adj. R-Square). For the relationship of rest financial ratios and stock returns; current ratio, inventory turnover, debt-to-equity ratio and stock returns shown that there are no relationship between financial ratios and stock returns. So, this research suggests that quarterly ROE and PE can explain the quarterly stock returns of technology industry in Stock Exchange of Thailand.

For future research, firstly, the study should consider some error terms in regression equation such as firm size and firm growth. Secondly, the study should apply Generalized Least Squares (GLS) estimate; which are the more efficient method than OLS, the relationship between financial ratios and stock return and then compare with the result of OLS estimate in order to see which methodology is more reliable to technology industry in Thailand.

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