Analysis of Influencing Factors for Trading Value in Telecommunication Company

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Abstract

This paper aims to figure out the possible factors behind the trading value of a telecommunication company. Considering the closing price on the stock of True Corporation Company Limited for 54 months (July 2014 - December 2018), securities price of the ICT sector, securities price of SET50 index, and US dollar exchange rate are taken into a linear model and analyzed. Both descriptive and inferential statistics are accordingly presented. Multiple linear regression analysis is employed as the main tool for model fitting. At the significant level of 0.050, it is found that securities prices of the ICT sector and SET50 index have a linear relationship with the trading value of True Corporation Co., Ltd. with the coefficient of determination of 0.919. The signals from securities prices of the ICT sector and SET50 index can be the guideline for trading on the stock of True Corporation Company Limited.

Keywords: Investment, Linear model, Model fitting, Multiple regression, Securities prices, Telecommunication.
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1. Introduction

During the growth of globalization, information and communication technology (ICT) has been playing a more and more important role in our everyday lives. Various types of electronically mediated information are transferred through telephone and computer networks. Telecommunication including interpersonal and mass communications is increasingly applied to many disciplines. As can be observed, the smartphone has been popularly used as the fundamental ICT platform for everybody around the world. Therefore, investing in the ICT sector is rapidly sprouted.

In Thailand, there are three private telecommunication companies including Advanced Info Service Public Company Limited (AIS), Total Access Communication Public Company Limited (DTAC) and True Corporation Public Company Limited (TRUE). There are two state enterprise telecommunication companies including TOT Public Company Limited and CAT Telecom Public Company Limited. The companies supply services on high-speed internet, cable television, digital content, 2G, 3G, 4G and 5G mobile network infrastructures. Securities trading of telecommunication companies is allowed trading in public and the center for securities trading is the Stock Exchange of Thailand (SET). Recently, securities of telecommunication companies have climbed to be in the list of top 50 companies in Thailand, called SET50 index. To invest in securities, data analysis for trading decision becomes the major concern. Behind the variation of each stock price, demand, and supply, market news, institutional buyers, company's earning, economic conditions, industry performance, and others are examples of influential factors (Fama & French, 1993; Jung & Boyd, 1996; Azam & Kumar, 2011; Ivanovski et al., 2016; Han & Nordin, 2017). However, it is quite difficult to assess and analyze the impact of those factors on the stock price as it lacks available data measurement and indicators. Thus, it is better to look for some relevant quantitative information corresponding to the variation of the stock price. In case of a telecommunication company, US dollar exchange rate, total trading value in ICT sector, consumer price index, inflation rate, Dow Jones industrial index, business sentiment index, bond index, and other rationales are revolved (Jeffres & Atkin, 1996; Meade & Islam, 2015). To deal with such problem, regression analysis is practically applied and it is believed to be the most efficient and simple approach. Generally, the most two popular regressions used in business are simple and multiple regressions (Cheng et al., 1990; Enke et al., 2011; Dutta et al., 2012; Sopipan et al., 2012; Gharehchopogh et al., 2014).

The purpose of this paper is to figure out the influencing factors behind the trading value of True Corporation Co., Ltd. Taking securities price of ICT sector, securities price of SET50 index, consumer price index, and US dollar exchange rate into account of possible factors, research methodology including data source and the formation of the linear model are illustrated in Section 2. Applying multiple linear regression

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analysis to the model, the empirical results are obtained and presented in Section 3, followed by the discussion and conclusion in Section 4.

2. Research Methodology

This section illustrates the implementation of a statistical model for studying the relationship between independent and dependent variables as shown in Table 1. The source of data used in this study and the formation of the linear model are described.

Table 1 Descriptions of variables

Variables	Descriptions	Unit	Duration
TRU	Trading value of True Corporation Co., Ltd.	Million Baht	
ICT	Securities price of ICT sector	Million Baht	Jul 2014 - Dec 2018
SET	Securities price of SET50 index	Million Baht	(Sample size = 54 months)
USD	Exchange rate of US dollar	Baht: Dollar	

2.1 Data Source

The trading value of TRU affected by ICT, SET, and USD is the major concern in this study. The historical record of secondary data is from the official website of SET (Stock Exchange of Thailand, 2018). All-time series of TRU, ICT, SET, and USD are collected and averaged in months with the sample size of 54. To see the variation of each variable against time in months, the graphical presentations are given in Figure 1. In addition, the descriptive statistics including mean, standard deviation, minimum, and maximum of each variable can be obtained as Table 2.
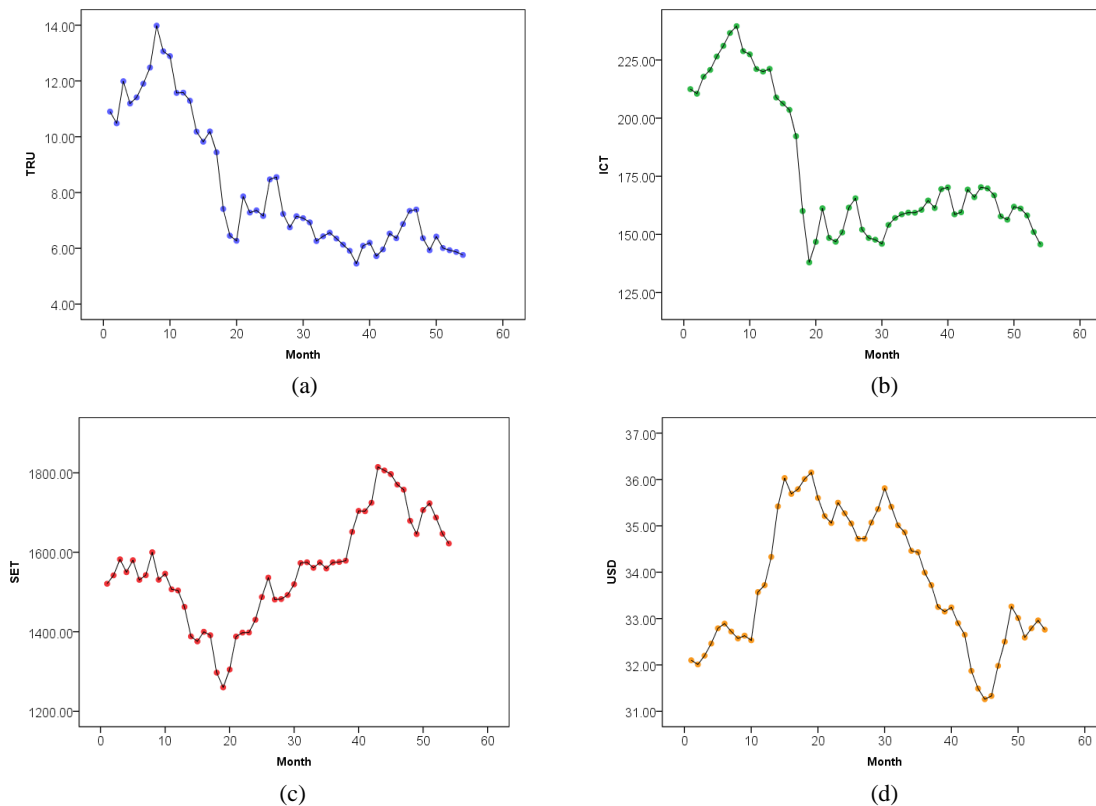

(a)

(b)

(c)

(d)

Figure 1 Plots of TRU, ICT, SET and USD against time (months)

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Table 2 Descriptive statistics of variables

Variables	n	Minimum	Maximum	Mean	Std. Dev
TRU	54	5.45	13.98	8.1506	2.4217
ICT	54	137.94	239.57	177.1207	30.2825
SET	54	1260.02	1814.71	1556.3665	132.2157
USD	54	31.26	36.15	33.4450	1.4278

2.2 Linear Model

It is assumed that ICT, SET and USD are influencing factors behind TRU. Thus, a simple statistical model is first formulated as

$$\text{TRU} = \beta_0 + \beta_1 \text{ICT} + \beta_2 \text{SET} + \beta_3 \text{USD} + \varepsilon \qquad (1)$$

where β_0, β_1, β_2, and β_3 denote the intercept and coefficients for independent variables, respectively, and $\varepsilon \sim N(0, 1)$ denotes the error. To examine the suitability of each variable in the model (1), the relationship between variables are considered using Pearson coefficients. Then, multiple linear regression is employed for identifying the coefficients of the remaining variables.

3. Empirical Results

Before applying multiple regression analysis, two main criteria must be satisfied. First, the dependent variable and each of the independent variables should have a linear relationship. Second, independent variables should not be highly correlated with each other, or so-called multicollinearity. To begin with the first criterion, it is a must to consider whether TRU is correlated with ICT, SET, and USD. Thus, the following four hypotheses need to be examined;

Hypothesis 1

H_0 : ICT has no relationship with TRU

H_1 : ICT has relationship with TRU

Hypothesis 2

H_0 : SET has no relationship with TRU

H_1 : SET has relationship with TRU

Hypothesis 3

H_0 : USD has no relationship with TRU

H_1 : USD has relationship with TRU

Table 3 Pearson correlations between variables ICT, SET, USD and TRU

Variables	ICT	SET	USD
TRU	0.938	-0.274	-0.142
Sig. (2-tailed)	0.000*	0.045*	0.305
N	54	54	54

* $p < 0.05$

To test the mentioned hypotheses, correlations between variables are examined using Pearson correlations as shown in Table 3. It is found that hypotheses 1 and 2 reject H_0, but hypothesis 3 accepts H_0. That is, ICT (P-value = 0.000 < 0.050) and SET (P-value = 0.045 < 0.050) have relationship with TRU whereas USD (P-value = 0.305 > 0.050) does not have. Subsequently, USD is removed from the model (1) and it yields

$$\text{TRU} = \beta_0 + \beta_1 \text{ICT} + \beta_2 \text{SET} + \varepsilon . \qquad (2)$$

Furthermore, it is in need to consider whether ICT and SET have an effect on TRU. That is, the following hypothesis is examined;

Hypothesis 4

$H_0 : \beta_1 = \beta_2 = 0$

$H_1 : \beta_1 \neq 0 \text{ or } \beta_2 \neq 0$

Considering ANOVA in Table 3, it is found that P-value $= 0.00 < 0.05$. Thus, the null hypothesis H_0 is rejected and the alternative hypothesis H_1 is accepted. That is, $\beta_1 \neq 0 \text{ or } \beta_2 \neq 0$ at the significance level of 0.05.

Table 4 ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	286.721	2	143.360	303.185	0.000*
Residual	24.115	51	0.473		
Total	310.836	53			

* p < 0.05

Table 5 Coefficients

Model	Unstandardize Coefficients		Standardize Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
Constant	0.995	1.284		0.775	0.442		
ICT	0.074	0.003	0.923	23.599	0.000*	0.995	1.005
SET	-0.004	0.001	-0.208	-5.308	0.000*	0.995	1.005

* p < 0.05

Focusing closely to the influence of ICT and SET on TRU, it is needed to examine whether each coefficient is equal to 0 by the following hypotheses:

For the influence of ICT on TRU, we have

Hypothesis 5

$H_0 : \beta_1 = 0$

$H_1 : \beta_1 \neq 0$.

For the influence of SET on TRU, we have

Hypothesis 6

$H_0 : \beta_2 = 0$

$H_1 : \beta_2 \neq 0$.

Regarding the result in Table 4, both null hypotheses H_0 are rejected. That is, β_0 (P-value $= 0.442 > 0.050$) is excluded from the model whilst β_1 (P-value $= 0.000 < 0.050$) and β_2 (P-value $= 0.000 < 0.050$) are still included in the model. Furthermore, there is no multicollinearity among independent variables because the value of tolerance is 0.995 and it approaches 1. Therefore, ICT and SET have an effect on the value of TRU. The model (2) is reduced to be

$$TRU = \beta_1 ICT + \beta_2 SET + \varepsilon. \tag{3}$$

From Table 4, the values of coefficients β_1 and β_2 are identified by SPSS software. The coefficients of the model (3) are clarified and it finally yields

$$\hat{TRU} = (0.074)ICT - (0.004)SET \tag{4}$$

$$Z_{TRU} = (0.923)Z_{ICT} - (0.208)Z_{SET} \tag{5}$$

where $\hat{TRU}$ is the approximate of TRU with unstandardized coefficients and Z_{TRU} is the one with the standardized coefficients. Equation (4) comes up with the coefficient of determination (R^2) of 0.919 and the standard error of estimate (S) of 0.688. Significantly, $R^2 = 0.919$ and $S = 0.688 < 2.5$ imply that ICT and SET have a high level of relationship with TRU. From equation (4), it means that changing in ICT value for 1 unit can directly vary TRU value for 0.074 unit. Likewise, changing in SET value for 1 unit can inversely vary TRU value for 0.004 unit. To support the assumption of multiple linear regression, more evidence is accordingly presented. As displayed in Figure 2, each of the independent variables (ICT and SET) has a linear relationship with the dependent variable (TRU). Figure 3(a) shows that the error has normal distribution via normal P-P plot of regression standardized residual and Figure 3(b) shows the variance of error is constant (approximately between -2 and 2).
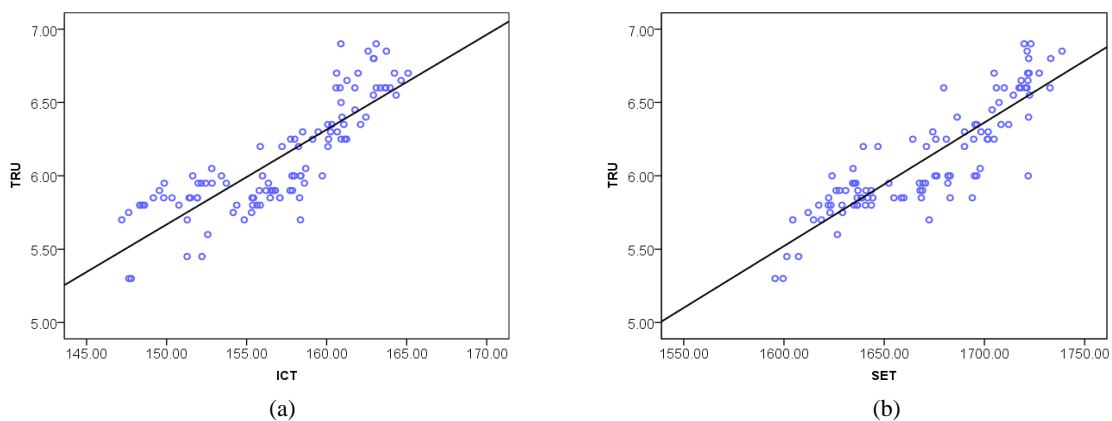

| (a) | (b) |

Figure 2 Scatterplots presenting the linear relationships between dependent and independent variables

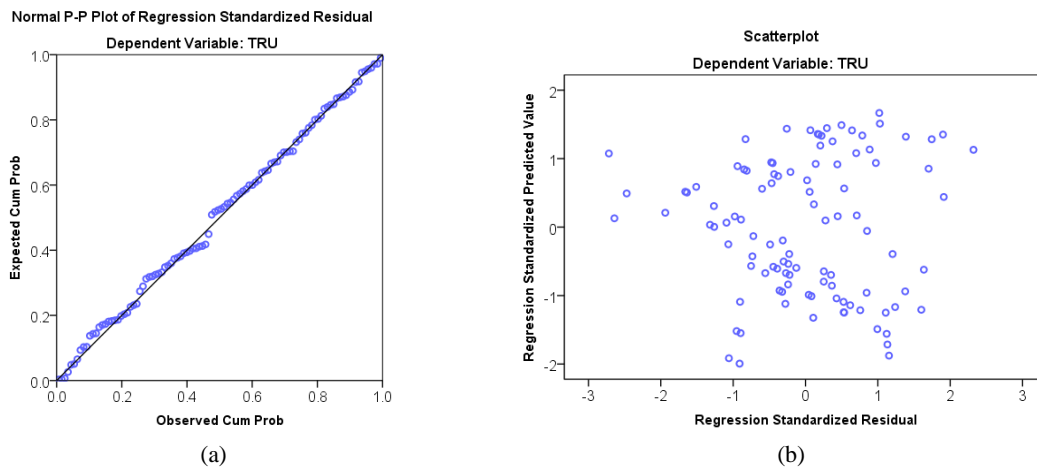| (a) | (b) |

Figure 3 Normal P-P plot of regression standardized residual and predicted value

4. Discussion and Conclusion

This paper has introduced a linear model of the trading value (TRU) of True Corporation Co., Ltd. Three factors including ICT, SET, and USD are expected to have a linear relationship with TRU. Six hypotheses have been examined corresponding to multiple linear regression analysis at the significance level of 0.05. From hypotheses 1-3, it is seen that there is no relationship between USD and TRU whilst ICT and SET significantly have a linear relationship with the value of TRU. Hence, USD is removed from the model, but ICT and SET considerably remain in the model. Using SPSS software to analyze the data, it has been confirmed by hypotheses 4-6 that the coefficients of both ICT and SET are not zeros. From then,

the coefficients of ICT and SET are identified by multiple linear regression and the linear equation describing the relationship is finally obtained as $\hat{TRU} = (0.074)ICT - (0.004)SET$ with the coefficient of determination $R^2 = 0.919$ and standard error of estimate S = 0.688. The statistical and graphical evidence have a good agreement with the assumption of multiple linear regression. It is sensible to take the variations of ICT and SET into account when trading on the stock market of a telecommunication company, especially True Corporation Company Limited (TRU). Since the stock of TRU is included in the total price from all ICT sectors and is also recorded by SET50 index, the signals from ICT and SET will support and benefit for making a decision when trading in the stock of TRU.

5. Acknowledgements

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