Economic Factors Affecting the Return on the Stock Price Index of Service Industry in MAI

ปัจจัยทางเศรษฐศาสตร์ที่มีต่อผลตอบแทนของดัชนีราคาหุ้นในกลุ่มอุตสาหกรรมบริการในตลาดหลักทรัพย์ เอ็ม เอ ไอ

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Abstract

The objective of this study is mainly to investigate the predictive power of given economic factors upon stock price index of service industry in the market for alternative investment in Thailand during 2015-2017 (March). The given economic factors include the securities price index of the Stock Exchange of Thailand (SET), MAI stock trading value (TOV), dividend yield (DIV) and Market Cap (MAC). By employing the secondary data derived from MAI database, they were analyzed by using Multiple Linear Regressions with Ordinary Least Squares (OLS). The study found that the securities price index of the Stock Exchange of Thailand (SET), MAI stock trading value (TOV) have negative impact upon stock performance while dividend yield (DIV) and Market Cap (MAC) have positive impact upon stock performance with 73.27 % (which Market Cap has significant effects on DV) of predictive power based on the Multiple Regressions Equation. The study also reveals that Market Cap is the most important economic factor to predict the variance in stock performance of service industry in MAI.

Keywords: Stock Performance, Market for Alternative Investment, Ordinary Least Square

บทคัดย่อ

วัตถุประสงค์ของการศึกษาในครั้งนี้หลักคือการสำรวจอำนาจการพยากรณ์ของตัวแปรทางเศรษฐศาสตร์ที่เลือกไว้ที่ส่งผลต่อดัชนีราคาหุ้นของหุ้นในอุตสาหกรรมบริการในตลาดหลักทรัพย์สำหรับการลงทุนทางเลือก *(เอ็ม เอ ไอ)* ตั้งแต่ปี *2558-2560 (เดือน มีนาคม)* โดยปัจจัยทางเศรษฐศาสตร์ ได้แก่ ดัชนีราคาหุ้นตลาดหลักทรัพย์แห่งประเทศไทย (*SET),* มูลค่าซื้อขายหลักทรัพย์ เอ็ม เอ ไอ (*TOV),* อัตราเงินปันผลตอบแทน (*DIV)* และ มูลค่าหลักทรัพย์ตามราคาตลาด (*MAC)* ด้วยข้อมูลทุตยภูมิที่ได้รับจากฐานของข้อมูลของ เอ็ม เอ ไอ จะถูกวิเคราะห์การถดถอยเชิงเส้นพหุ แบบวิธีกำลังสองน้อยที่สุดแบบธรรมดา ผลการศึกษาแสดงให้เห็นว่า ดัชนีราคาหุ้นตลาดหลักทรัพย์แห่งประเทศไทย (*SET)* และ มูลค่าซื้อขายหลักทรัพย์ เอ็ม เอ ไอ (*TOV)* มีผลกระทบทางบวกต่อผลตอบแทนของหุ้น ขณะที่ อัตราเงินปันผลตอบแทน (*DIV)* และ มูลค่าหลักทรัพย์ตามราคาตลาด (*MAC)* มีผลกระทบทางลบต่อผลตอบแทนของหุ้น ด้วยความสามารถในการพยากรณ์ *73.27 %* จากสมการถดถอยพหุ การศึกษานี้ยังเปิดเผยว่า มูลค่าหลักทรัพย์ตามราคาตลาด เป็นปัจจัยทางเศรษฐศาสตร์ที่สำคัญในการพยากรณ์ความแปรปรวนต่อผลตอบแทนของหุ้นอุตสาหกรรมบริการในตลาดหลักทรัพย์สำหรับเอ็ม เอ ไอ

คำสำคัญ : ผลตอบแทนของหุ้น ตลาดหลักทรัพย์สำหรับการลงทุนทางเลือก วิธีกำลังสองน้อยที่สุดแบบธรรมดา

Introduction

A financial market is a general term describing any marketplace where such financial assets are traded including equities, bonds, currencies, derivatives and securities. This market has a significant contribution to country's growth so that it can be found in several countries around the world as a financial mean to transfer financial assets from people who have an excessive one to the one who are in need. As such, business activities such as production, trade exchange as well as employement are driven (Association of Thai Securities Companies, 2014). Considering that a significant source of financial capital generation, both investors and business firms pay more and more attention on participating in this financial market. In 2016, the total value of securities trading was approximately 13,000,000 million Baht with 134 listed companies, an increase of 19 % from previous year (2015) and the number is expected to continuously increase (Association of Thai Securities Companies, 2016).

In Thailand, market for alternative investment (MAI) is one of two security markets which was found in 1998 as a alternative financial market for small and medium businesses. MAI

has become one of signifinicant financial choices which has a mian focus on creating value for high potential, innovative and ventured companies in ASEAN as mentioned in its vision (Yuwadee Kruerattikarn, 2014). While Stock Exchange of Thailand was established to raise long-term funds for registered firms with paid capital of 300 million baht or more, MAI focuses primarily on those firms with paid capital of 20 million baht or more. With loosen requirements needed for firms to register, it seems to attract a wide range of small and medium businesses as an initial source of financial capital. By Febuary 2015, MAI officially divided securities into 8 industry groups just the same as SET including agro and food (AGRO), consumer products (CONSUMP), financial (FINCIAL), industrials (INDUS), property and construction (PROPCON), resources (RESOURC), technology (TECH), and services (SERVICE) (SET Group Websites, 2016). With currently 134 registered firms (2016), MAI has a potential to support more SMEs.

Service sector can now serve as a new driving factor for Thailand economic growth because it can create high income and new job opportunities. An approximate half of Thailand's output comes from service businesses. Due to the government support, the number of service businesses has significantly increased and driven the financial markets. From an investor's perspective, service sector is one of the top securities that investors prefer to have it in their portfolio because its potential performance. As such many investors and researchers have paid more attention on how to increase the securities performance in light of high returns. As it can be seen from the following paragraph.

Many studies attempt to investigate several factors affecting the stock price index including Atiphat Rojanawutthitikun (2011); Almajali, Alamro, & Al-Soub (2012); Aurangzeb (2012); Kpanie, Esumanba, & Sare (2014). Additionally, there are some papers which attempted to investigate the links between various factors and stock price index including Wanchai Aemlaoo (2009); Wasit Totrakunpitak (2009); Danaikarn Intrapong (2010); Ratchanee RungsriRattanawong (2010); Suchitta Puengrang (2010); Wiranya Lohaphon (2010); Suwapich Bunluerit (2011); Sumalee Reuanggun and Wanrapee Bannchuenvichintra (2013); Wiratpatchara Wiboonchaiborworn and Wanrapee Bannchuenwichitra (2013); Yuwadee Kruerattikarn (2014) and Thitiwat Khumwiwat (2015). Apart from these papers, there are somes studies focusing on the relationship between economic factors (macro or micro) and stock related factors such as Flannery & Protopapadakis (2002); Suwapich Bunluerit (2011);

Nopphon Tangjitprom (2012); Worapong Joungrattanakamjorn and Phassawan Suntraruk (2016); Anshika (2017) and Dabo & Afang (2017). Although there are many studies attempted to investigate the relationship between the selected factors and stock performance in the financial markets, only a few has been done in MAI especially in service sector. Therefore, this study will shed light on how to increase attractiveness and potential of this new market for both investors and companies.

In this study, five economic factors are used including the securities price index of the Stock Exchange of Thailand (SET), MAI stock trading value (TOV), dividend yield (DIV), Market Cap (MAC) and stock performance as represented by MAI index (MAI). By using Multiple Linear Regressions with Ordinary Least Squares (OLS), the relationship between given factors and stock performance as represented by SET is investigated. In doing so, the study starts with a literature review regarding economic factors and their relationship with stock performance followed by methodology, data analysis and assumption testing, findings and the final section devotes to conclusion and discussions along with recommendations for further studies.

The objective of the study

The objective of this study is mainly to investigate the predictive power of given economic factors including the securities price index of the Stock Exchange of Thailand (SET), MAI stock trading value (TOV), dividend yield (DIV) and Market Cap (MAC) upon stock price index as represented by MAI index (MAI) of service industry in the market for alternative investment in Thailand during 2015-2017.

Scope of research

According to review literature, it shows that economic factors including the securities price index of the Stock Exchange of Thailand (SET), MAI stock trading value (TOV), dividend yield (DIV), Market Cap (MAC) have effects on the return on stock price index. This study pays attention on building the framework by adding these four economic factors in order to predict the stock price index of Service Industry in MAI. The framework for this study presents as follow.

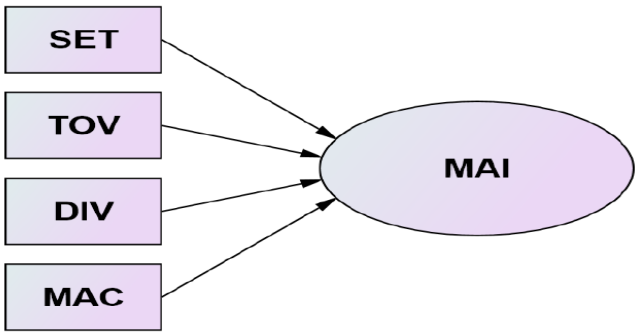

Figure 1 Framework for the study

Methodology and data Analysis

For this research study, the secondary data provided by SET Market Analysis and Reporting Tool since January 2015 to March 2017. The focus was on the given economic factors including the securities price index of the Stock Exchange of Thailand (SET), MAI stock trading value (TOV), dividend yield (DIV), Market Cap (MAC) and MAI index (MAI) of service industry in the market for alternative investment. Due to the differences of unit of measurement, the study adjusted the data by transforming them into the percent change identical as dividend yield.

According to the transformation of selected factors, the new factors were formed. RMAI is the log difference of MAI index. RSET is the log difference of the securities price index of SET which represents the percent change. RTOV is the log difference of MAI stock trading value. RMAC is the log difference of Market Cap. These new factors represented data in terms of the monthly percent change of given factors.

In data analysis section, Eviews for econometric analysis program (version 9.5) was used to analyze both descriptive and inferential statistics. The result started with the descriptive statistics which intended to describe the characteristics of selected variables in the study (Babbie, 2010). This included frequency, percentage, mean and standard deviation of the selected factors. The study also employed the Multiple Linear Regressions with Ordinary Least Squares (OLS) for inferential statistics to investigate the predictive power of given economic factors including the securities price index of the Stock Exchange of Thailand (SET), MAI stock trading value (TOV), dividend yield (DIV) and Market Cap (MAC) upon stock performance of service industry in the market for alternative investment in Thailand. The highlight of the study would also be on the assumption testing which intentionally and

comprehensively employed the concept of the Best Linear Unbiased Estimator (BLUE) properties. As such, the relationship between the selected variables on the dependent variable was examined regarding the purposed objective by means of the Multiple Regressions Equation in order to predict the outcome variable regarding the selected variables.

In the preliminary analyses, a certain set of assumptions regarding BLUE properties are proceeded as follows.

Firstly, test of utility of model is checked by the F test statistic which is the ratio of the explained variability and the unexplained variability and each divided by the corresponding degree of freedom. The study expects to have the larger F statistics with significant value so that null hypothesis was rejected meaning that at least one of the predictors is linearly linked to the dependent variable.

Table 1 F-statistics

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.050977	0.041197	-1.237391	0.2296
RSET	-0.036287	0.245346	-0.147903	0.8838
RTOV	-0.021338	0.024474	-0.871898	0.3931
DIV	0.022322	0.023615	0.945259	0.3553
RMAC	0.937464	0.128571	7.291443	0.0000

R-squared	0.732739	Mean dependent var	-0.008077
Adjusted R-squared	0.681832	S.D. dependent var	0.064468
S.E. of regression	0.036364	Akaike info criterion	-3.619416
Sum squared resid	0.027770	Schwarz criterion	-3.377474
Log likelihood	52.05241	Hannan-Quinn criter.	-3.549745
F-statistic	14.39369	Durbin-Watson stat	2.140274
Prob(F-statistic)	0.000008		

Secondly, the White test is proceeded to investigate the forms of heteroskedasticity which is the condition that variance of errors in regression model is not consistent across observations and this will invalidate the OLS result so that the variance of errors should be consistent as so called, Homoskedasticity. In table xxx, the White test shows that there was no significant. As can be seen that the probability of observed R^2 was more than 5% meaning that the variance of residual was constant or null hypothesis was accepted. The result implies that there was no assumption violation in terms of analysis of variance.

Table 2 Heteroskedasticity Test: White Test

F-statistic	0.329343	Prob. F(14,11)	0.9731
Obs*R-squared	7.679358	Prob. Chi-Square(14)	0.9054
Scaled explained SS	9.489494	Prob. Chi-Square(14)	0.7985

Next, autocorrelation is another condition that may occur when error terms are correlated over time which does not lead to the independence of error terms. The violation of these error terms relationships results in biased regression model so that the study expects to have the independence of error terms. By employing Breusch-Godfrey Serial Correlation LM test, the result in table 3 shows that the probability of observed R^2 was more than 5% meaning that the independence of error terms was found or null hypothesis was accepted. Similarly, Durbin-Watson statistic was also expected to be between 1.5 to 2 indicating that there was no autocorrelation in the sample.

Table 3 Breusch-Godfrey Serial Correlation LM Test and Durbin-Watson Statisitic

F-statistic	0.745734	Prob. F(4,17)	0.5741
Obs*R-squared	3.881128	Prob. Chi-Square(4)	0.4223

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.001385	0.042536	0.032550	0.9744
RSET	-0.118393	0.263738	-0.448904	0.6592
RTOV	0.010364	0.025841	0.401067	0.6934
DIV	-0.001785	0.024380	-0.073232	0.9425
RMAC	0.009568	0.134934	0.070910	0.9443
RESID(-1)	-0.050553	0.244276	-0.206951	0.8385
RESID(-2)	-0.423326	0.274976	-1.539499	0.1421
RESID(-3)	0.361454	0.373900	0.966715	0.3472
RESID(-4)	0.143521	0.397282	0.361258	0.7224

R-squared	0.149274	Mean dependent var	1.49E-17
Adjusted R-squared	-0.251067	S.D. dependent var	0.033328
S.E. of regression	0.037278	Akaike info criterion	-3.473389
Sum squared resid	0.023624	Schwarz criterion	-3.037894
Log likelihood	54.15405	Hannan-Quinn criter.	-3.347982
F-statistic	0.372867	Durbin-Watson stat	1.919684
Prob(F-statistic)	0.920743		

After that, multicollinearity is the condition that the interrelationship among independent variables presents high correlation which lead to invalid statistical analysis. To detect this

condition, there are two statistics that are normally used to measure the problem such as Variance Inflation Factors (VIF) and a tolerance value. According to table 4, VIF shows that there was no violation of this assumption because all the VIF values were between 1.042 to 1.186 which were less than 10.

Table 4 Variance Inflation Factors

Variable	Centered VIF
C	NA
RSET	1.042011
RTOV	1.186440
DIV	1.071471
RMAC	1.141283

Then, the normality is another statistical condition that is expected in this study. The shape of the data distribution of all variables should be normal in order to follow the assumption of normality. To investigate this condition, Jarque-Bera statistics was employed. The statistical test shows that the probability of Jarque-Bera statistic was more than 5% meaning that the data distribution of all variables was found to be normal or null hypothesis was accepted.

The Findings

After considering the preliminary analyses, there is no serious violation of the data assumption regarding BLUE properties as presented in previous section, the Multiple Linear Regressions with Ordinary Least Squares (OLS) is then proceeded in order to test the proposed hypotheses. By using the EViews for econometric analysis program (version 9.5), the Multiple Linear Regression is performed. In the first step, descriptive analysis is presented. Regression analysis is then used to test the hypotheses using the regression equation. The detailed results of the analysis are presented as follows.

Firstly, descriptive analysis is the statistical tool used to summarize the data. The study formulates descriptive table for the analysis. The result presents the characteristics of a sample in the study.

Table 5 Descriptive Statistics for percent change of each variable

	N	Minimum	Maximum	Mean	Std.Dev.
RMAI	28	1.89	2.06	1.970	0.042
RSET	28	3.11	3.20	3.166	0.027
RTOV	28	3.82	4.42	4.081	0.137
DIV	28	0.97	2.21	1.686	0.337
RMAC	28	4.84	4.97	4.907	0.035

According to table, it shows the descriptive analysis which includes a total number of observations, minimum value, maximum value, mean value along with standard deviation of all factors. The outcome factor is MAI index which shows that the total number of observations in 2015-2017 is 28, minimum value is 1.89, maximum value is 2.06, mean value is 1.9695 and standard value is 0.042

There are four independent factors including the securities price index of the Stock Exchange of Thailand (SET), MAI stock trading value (TOV), dividend yield (DIV) and Market Cap (MAC). The descriptive statistics of percent change show that SET has 28 of the total observations, minimum value is 3.11, maximum value is 3.20, mean value is 3.166 and standard value is 0.027. TOV has 28 of the total observations, minimum value is 3.82, maximum value is 4.42, mean value is 4.081 and standard value is 0.137. DIV has 28 of the total observations, minimum value is 0.97, maximum value is 2.21, mean value is 1.686 and standard value is 0.337. MAC has 28 of the total observations, minimum value is 4.84, maximum value is 4.97, mean value is 4.907 and standard value is 0.035.

After descriptive statistics are considered, the regression analysis is used and presented in table 6.

Table 6 Regression Analysis

Predicting Variables	Coefficient	Std.Error	t-statistics	Sig.
Constant	-0.051	0.041	-1.237	0.230
RSET	-0.036	0.245	-0.148	0.884
RTOV	-0.021	0.024	-0.872	0.393
DIV	0.022	0.024	0.945	0.355
RMAC	0.937	0.129	7.291	0.000***

R^2 = 0.733; Adjusted R^2= 0.682; S.E. of Regression = 0.036; F-statistic = 14.394; P value = 0.000

***p < 0.05; **p < 0.01; ***p < 0.000**

According to this table, coefficient values, t-scores, p-value, and the value of R square are presented and interpreted. The result of the regression analysis where RMAI is outcome variable, while RSET, RTOV, DIV and RMAC as independent variables. The Multiple Linear Regressions with Ordinary Least Squares (OLS) was used to test if the stock performance is significantly predicted by the given factors. Due to the adjusted data, the results of the regression indicated the four predictors explained 73.3% of the variance (Adjusted R^2 = 0.682, (F-statistic =14.394, p<.01). It was found that RMAI is significantly predicted by RMAC (β = .937, p<.001), while RSET, RTOV and DIV insignificantly predicted (β = -.036, -.021 and .022 p>.05 respectively). The result implied only one predicting variable included Market Cap. (RMAC) is positive and significant. Hence, stock performance as represented by MAI index (MAI) can be explained by RMAC significantly, the stock performance will increase when Market Cap increased. While the log differences of securities price index of the Stock Exchange of Thailand (RSET) and the log differences of MAI stock trading value (RTOV) are demonstrated the negative impact but not significant, the stock performance will increase when RSET decreased or/and RTOV decreased but they are insignificant, the dividend yield (DIV) is presented the positive impact but not significant, the stock performance will rise when DIV went down. Therefore, Market Cap has highly significant effects on DV under Normality assumption.

Discussions

The regression equation is investigated four economic factors including the securities price index of the Stock Exchange of Thailand (SET), MAI stock trading value (TOV), dividend yield (DIV), Market Cap (MAC) which affected stock performance as represented by MAI index (MAI) of service industry in the market for alternative investment. The result based on the secondary data since January 2015 to April 2017 indicated the exchange rate is significant, this result is related to previous scholars has been confirmed the impact of exchange rate on stock performance though investigated through difference sectors and different period of time (Boonrueng & Chaithip, 2011; Jitnawasan and Konhsawatdikerti, 2012; Tangjitprom, 2011). Because of the exchange rate factor is directly related to the money issue or tourism expenditure, hence this determinants is significantly related to the tourism price index. However, the consumer price index, diesel price, and occupancy rate are insignificant to explain the performance of tourism price index. Consumer price index is insignificant because

this factor is calculated by Ministry of Commerce of Thailand which represented the prices of only the goods and services bought by consumers in Thailand or exclude the foreigner index it might not be affected on tourism price index sufficiently, and the previous researchers claimed that claimed the economy or government policy in that period might not be encouraged or stimulated enough on the commerce or tourism sector to change the price index (Danwantanakul & Banchenvijitara, 2013; Pungrang (2010). Diesel retail prices is insignificant perhaps the policy of Ministry of Energy in 2012 – 2016 might different when compare in the past, and Boonrueng and Chaithip (2011) diesel price has significantly impact only ASIA, MANRIN, and SHANG, while CENTEL, DTC, ROH were insignificant based on secondary data from 2007 – 2012. Occupancy rate is not significant because the hotel occupancy rate is presented the overall of country but secondary data that determined to investigate come from only twelve firms in SET within service sector, and Rohaphon (2010) claimed that the economic factor and size of hotel might effect on occupancy rate but secondary data does not imply separately.

Recommendations

For investors who are interested in the service industry group in MAI, the proposed model can be helpful because the model shows trends of economic factors that affect the return on stock price index in this segment especially Market Cap variable (MAC) which presents the significantly positive reinforcement on the stock price index of Service Industry in MAI. This means that if Market Cap has 1-unit increase, then the return on stock price index will significantly increase at 0.937 unit. Therefore, the investors could practically see the trends and directions of the return on the stock price index in the Service industry in MAI via the observation of Market Cap which allows practitioners to predict the stock price index of Service Industry in MAI. For academic view point, this study would step-by-step provide information about how to employ the Multiple Linear Regressions with Ordinary Least Squares (OLS) using EViews application in order to investigate the predictive power of given economic factors including the securities price index of the Stock Exchange of Thailand (SET), MAI stock trading value (TOV), dividend yield (DIV) and Market Cap (MAC) upon stock performance of service industry in the market for alternative investment in Thailand. As the result of this study, the paper would be a basic guideline for researchers who are interested.

Future Studies

There were still gaps in this current study as presented in the following.

1) Based on the derived data, the research used the data from MAI which currently divided securities into 8 industry groups in 2015 so that the small number of observations have been recorded. While the predictive power is theoretically limited, the intensive test of data assumptions would allow the study to provide update and more valid result as possible. Therefore, the model could lay the building block for further study and be re-tested to confirm the results using more data in the future and a comparative study should also be an interesting way to conduct the future research. Lag time is another issue that needs to be considered when selecting any variables such as Dividend.

2) Since the derived Multiple Regression Equation aims to explore a series of connected correlations among a set of given factors, it would be meaningful for researchers to add more distinctive factors in order to improve the predictive power of the model, such as the control variables (i.e. age, size or group of the organization) and the other variables (i.e. other micro and macro-economic factors as well as other relevant factors).

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