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ECONOMIC FACTORS AFFECTING STOCK RETURNS: A STUDY OF LISTED CONSTRUCTION MATERIALS FIRMS IN THAILAND

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Abstract

The purpose of this study is to examine economic factors, including percentage change in exchange rate (EX), percentage change in consumer price index (CPI), percentage change in construction materials price index (CMPI), and percentage change in oil price (OIL), affecting stock returns of listed construction materials firms in Thailand. The samples are listed firms in the construction materials sector in SET50 Index in 2017, namely the Siam Cement Public Company Limited (SCC), Siam City Cement Public Company Limited (SCCC), and TPI Polene Public Company Limited (TPIPL). The monthly data of all variables during the period from January 2013 to December 2017 are employed. The results from the multiple regression with ordinary least square show that, for all firms, only the percentage change in exchange rate (EX) significantly affects stock returns in the opposite direction.

Keywords: Economic factors, Stock returns, Construction materials sector, Cement firms

Introduction

According to Kasikorn Research Center (2017), the construction materials business in Thailand was growing. It was expected to increase around 10-12% in 2017 because of both government and private sector projects. Examples of government projects are electric train construction, airport renovation, water resources development, and other infrastructure development. Private sector projects include the construction of houses, shopping malls, office buildings, and factories. One of the major construction materials required in every project is cement.

In 2016, the aggregate capacity of cement production of 10 Southeast Asia countries was 273 million tons per year, approximately 7% of the world capacity. The first three countries in Southeast Asia that have the highest capacity of cement production were Vietnam, Indonesia, and Thailand. In Thailand, there are 7 companies and 12 factories manufacturing cement. The combining capacity of Siam Cement Public Company Limited (SCC), Siam City Cement Public Company Limited (SCCC), and TPI Polene Public Company Limited (TPIPL) provides more than 85% of cement production in Thailand. Additionally, demand in cement in Thailand increased from 30.8 million tons in 2015 to 32.6 million tons in 2016 or a growth of 5.84%. Referring to the Thai government mega projects in infrastructure expansion and development, demand in cement in Thailand remains in the rising trend. (Thai Cement Manufacturers Association, 2016)

Therefore, this study aims to investigate whether economic factors, including percentage change in exchange rate (EX), percentage change in consumer price index (CPI), percentage change in construction materials price index (CMPI), and percentage change in oil price (OIL), affect stock returns of cement firms (SCC, SCCC, and TPIPL) in the construction materials sector in the Stock Exchange of Thailand. The findings will benefit three parties. First, the government can make appropriate decisions on monetary and fiscal policy involving the related economic factors. Next, cement firms can manage exposure from the related economic factors, hence stabilizing their earnings. Lastly, investors can comprehend more about the impact of economic factors on stock returns and suitably make investment decision.

Literature review

There are various studies on the determinants of stock returns across industries around the world. For developed countries, in USA, Flannery and Protopapadakis (2002) study whether macroeconomic factors influence stock returns over the 1980-1996 period by using a GARCH model. They find that CPI and PPI affect the market portfolio's returns. However, they find no effect of Industrial Production and GNP on returns. In addition, Guru-Gharan, Rahman, and Parayitam (2009) examine the impact of macroeconomic factors on U.S. stock returns by employing monthly data from

January 1970 to December 2004 and find the significant effect of industrial production growth rate and inflation rate. On the other hand, the change in board money supply and the change in federal funds insignificantly affect stock returns. Next, in Europe, Peiro (2016) studies the relationship between stock prices and macroeconomic factors in European countries including France, Germany and UK, and finds the influences of production and interest rates on stock returns in all three countries. In UK, Shiu (2009) examines the association between economic factors, firm characteristics and performance by using a panel data analysis for United Kingdom life offices and finds the significant relation between interest rate and investment yield. Moreover, in Norway, Gjerde and Sxttem (1999) investigate relations among stock returns and macroeconomic variables by executing the multivariate vector autoregressive (VAR) on Norwegian data. The results show the effects of real interest rate changes and oil price changes on stock returns. Furthermore, Chen, Agrusa, Krumwiede, and Lu (2012) examine the influences of macroeconomic factors on hotel stock returns in Japan utilizing data for 30 years. They find that changes in discount rate, changes in unemployment rate and the percentage change in oil price significantly determine Japanese hotel stock returns. Lastly, Al-Tamimi, Alwan, and Rahman (2011) study the determinants of stock prices in the United Arab Emirates (UAE) stock markets during 1990-2005 by employing the data of 17 firms. The findings show the negatively significant effect of consumer price index as well as the insignificant effect of interest rate, money supply and GDP.

The investigation of stock return determinants is also essential for BRICS stock markets. For example, Tripathi and Kumar (2016) study the relationship between aggregate stock returns and macroeconomic factors (GDP, inflation, interest rate, exchange rate, money supply, and oil prices) in BRICS economies by utilizing the quarterly data during 1995-2014. The results display the positive association of BRICS stock returns with GDP, money supply and oil prices as well as the negative association of BRICS stock returns with inflation rate, interest rate and exchange rate. In India, Bhattacharya and Dasa (2014) study the relationship between macroeconomic factors and stock market returns in the Indian capital market from July 2000 to June 2010. They find the inverse relationship between interest rates, foreign involvement and oil prices with stock returns. Kotha and Sahu (2016) also explore the long and short run relations between macroeconomic indicators and stock market returns in India during July 2001-July 2015. The results show the long run relation between the BSE Sensex and the economic factors including exchange rate, wholesale price index, T-bill rates and M3. However, Chakraborty and Gupta (2017) find no significant effects

of the five macroeconomic factors (money supply, gold prices, exchange rate, GDP, and inflation) on the stock market return by employing the Arbitrage Pricing Theory (APT) in the Bombay Stock Exchange (BSE) from 2001 to 2015. In addition, Gupta and Reid (2013) investigate the sensitivity of industry-specific returns to monetary policy and macroeconomic news in South African stock market. They discover significant effects of monetary policy as well as CPI and PPI surprises on aggregate stock returns.

Additionally, there are many papers studying the relation between economic factors and stock returns by utilizing the data from developing countries. For example, in Jordan, Momani and Alsharari (2012) find the negative effect of interest rate and production index on the stock prices in Amman financial market during 1992-2010. Muflih AL-Qudah (2012) also examines listed companies in Amman Stock Exchange in Jordan from 2005 to 2010 and finds the significant effect of balance of payments, number of employees and the size of companies on the stock return as well as the insignificant effect of interest rate, budget deficits, gross domestic and inflation rate. Next, in Turkey, Rjoub et.al. (2009) study the Istanbul Stock Exchange (ISE) during January 2001 to September 2005 and discover the significant effect of unanticipated inflation, term structure of interest, risk premium, unemployment rate and money supply on stock market returns. However they find no significant effect of exchange rate. Er and Vuran (2012) employ the dynamic panel data analysis approach on 64 manufacturing firms in ISE and find that oil prices, economic growth, exchange rate, interest rate, and money supply can be used to explain the stock returns. Furthermore, Butt et.al. (2010) study the influence of economic factors on stock returns in the Karachi Stock Exchange in Pakistan over the period of 10 years. They find the negative effect of inflation, interest rate and exchange rate on stock returns. Recently, Mugambi and Okech (2016) investigate whether macroeconomic factors affect stock returns of listed commercial banks in Kenya during 2000-2015. They find the significant impact of interest rate, exchange rate and inflation on bank stock return as well as the insignificant impact of GDP. For emerging markets in Asia, Lim and Sek (2014) explore the inter-relationship between the volatility of exchange rate and stock return. The results exhibit significant bi-directional relationship between them in Indonesia, Korea and Thailand. Defrizal et.al. (2015) and Djamaluddin et.al. (2017) examine the data from Indonesian Stock Exchange and find that interest rate and exchange rate do not affect stock returns. In Thailand, Tangjitprom (2012) finds that 2-month lag of unemployment rate, interest rate, 2-month lag of inflation rate, and exchange rate can explain the variance in stock return.

Therefore, in order to fulfill the literature involving the impact of economic factors

on stock returns in Southeast Asia, this paper aims to examine whether the economic factors affect stock returns of listed construction materials firms in Thailand. Referring to the above literature review, the economic factors employed in this study include exchange rate (Tripathi and Kumar, 2016; Kotha and Sahu, 2016; Chakraborty and Gupta, 2017; Rjoub et.al., 2009; Er and Vuran, 2012; Butt et.al., 2010; Mugambi and Okech, 2016; Lim and Sek, 2014; Defrizal et.al., 2015; Djamaluddin et.al., 2017; Tangjitprom, 2012), consumer price index (Flannery and Protopapadakis,2002; Al-Tamimi, Alwan, and Rahman, 2011; Kotha and Sahu, 2016; Gupta and Reid, 2013), construction materials price index (Flannery and Protopapadakis, 2002; Guru-Gharan, Rahman, and Parayitam, 2009; Peiro, 2016; Gupta and Reid, 2013; Momani and Alsharari, 2012), and oil price (Gjerde and Sxttem, 1999; Chen, Agrusa, Krumwiede, and Lu, 2012; Tripathi and Kumar, 2016; Bhattacharya and Dasa, 2014; Er and Vuran, 2012).

Methodology

Data

This study uses the monthly data during the period from January 2013 to December 2017. The sample firms are listed firms in the construction materials sector in SET50 Index in 2017, comprising of the Siam Cement Public Company Limited (SCC), Siam City Cement Public Company Limited (SCCC), and TPI Polene Public Company Limited (TPIPL). The dependent variable is the stock returns of SCC, SCCC, and TPIPL. The independent variables are economic factors comprising of percentage change in exchange rate between Thai Baht and USD (EX), percentage change in consumer price index (CPI), percentage change in construction materials price index (CMPI), and percentage change in oil price (OIL).

Models

For each firm, the multiple regression with ordinary least square is utilized to examine the effect of economic factors on stock returns. The three models are as follows.

Model 1:

$$SCC_t = a + b_1EX_t + b_2CPI_t + b_3CMPI_t + b_4OIL_t + e_t$$

Model 2:

$$SCCC_t = a + b_1EX_t + b_2CPI_t + b_3CMPI_t + b_4OIL_t + e_t$$

Model 3:

$$TPIPL_t = a + b_1EX_t + b_2CPI_t + b_3CMPI_t + b_4OIL_t + e_t$$

Where:

SCC = Stock return of SCC (%)

SCCC = Stock return of SCCC (%)

TPIPL = Stock return of TPIPL (%)

EX = Percentage change in exchange rate : THB/USD (%)

CPI = Percentage change in consumer price index (%)

CMPI = Percentage change in construction materials price index (%)

OIL = Percentage change in oil price (%)

t = Time period 1, 2, 3, … , 60
(1 = January 2013; 2 = February 2013; … ; 60 = December 2017)

The hypotheses of this study are as follows.

H_0: None of the economic factors (EX, CPI, CMPI, and OIL) affects stock returns of listed construction materials firms in Thailand.

H_1: At least one of the economic factors (EX, CPI, CMPI, and OIL) affects stock returns of listed construction materials firms in Thailand.

Results

Table 1 Descriptive statistics

	SCC	SCCC	TPIPL	EX	CPI	CMPI	OIL
Mean	0.249517	-0.494682	-0.300544	0.148395	0.053296	-0.058626	-0.445909
Max	10.71429	23.78517	41.52047	3.517055	0.576312	1.732435	25.71549
Min	-14.19214	-15.63877	-90.52356	-1.561643	-0.588059	-1.919386	-20.72881
Std Dev.	4.560332	7.368640	16.54351	1.261024	0.245405	0.669284	8.601008

Table 1 shows the descriptive statistics of both dependent and independent variables. For dependent variable, SCC has the average return of 0.25%, the maximum return of 10.71%, the minimum return of -14.19%, and the standard deviation of 4.56%. SCCC has the average return of -0.49%, the maximum return of 23.79%, the minimum return of -15.64%, and the standard deviation of 7.37%. TPIPL has the average return of -0.30%, the maximum return of 41.52%, the minimum return of -90.52%, and the standard deviation of 16.54%.

For independent variables, the percentage change in exchange rate between Thai Baht and USD (EX) has the mean of 0.15%, the maximum of 3.52%, the minimum of -1.56%, and the standard deviation of 1.26%. The percentage change in consumer price index (CPI) has the mean of 0.05%, the maximum of 0.58%, the minimum of -0.59%, and the standard deviation of 0.25%. The percentage change in construction materials price index (CMPI) has the mean of -0.06%, the maximum of 1.73%, the minimum of -1.92%, and the standard deviation of 0.67%. The percentage change in oil price (OIL) has the mean of -0.45%, the maximum of 25.72%, the minimum of -20.73%, and the standard deviation of 8.60%.

Table 2 Unit root test

Variable	Augmented Dickey-Fuller Test Statistic		
	t-Statistic	Test Critical Value %5	Prob.*
SCC	-9.139803	-2.912631	0.0000
SCCC	-9.364226	-2.912631	0.0000
TPIPL	-6.352159	-2.915522	0.0000
EX	-4.990872	-2.912631	0.0001
CPI	-5.019206	-2.913549	0.0001
CMPI	-5.474653	-2.913549	0.0000
OIL	-5.695050	-2.912631	0.0000

From table 2, unit root tests exhibit Prob(t-Statistic) of less than 0.05 for all variables, meaning that the data has no problem of non-stationarity.

Table 3 Correlation matrix

	EX	CPI	CMPI	OIL
EX	1.000000			
CPI	0.007921	1.000000		
CMPI	-0.189555	0.529762	1.000000	
OIL	-0.034829	0.506813	0.480780	1.000000

Correlation among independent variables is shown in table 3. Since all of the correlations are between -0.8 and 0.8, there is no multicollinearity problem.

Table 4 Heteroskedasticity and autocorrelation tests

Model	Prob.	
	White Heteroskedasticity Test	Breusch-Godfrey Serial Correlation LM Test
SCC	0.561104	0.119887
SCCC	0.986711	0.326344
TPIPL	0.994488	0.507875

Before running the final equation, the problems of heteroskedasticity and autocorrelation are examined. For each model, as displayed in table 4, Prob. values from White heteroskedasticity test as well as Breusch-Godfrey serial correlation LM test are greater than 0.05, resulting in no heteroskedasticity and autocorrelation problems. Therefore, the final equations are as follows.

SCC = 0.475398 - 1.292817**EX** - 1.421653**CPI** - 0.361326**CMPI** + 0.064821**OIL**

(1.000057) (-3.172769)** (-0.520680) (-0.378276) (0.823940)

F-Statistic = 2.662193

Prob(F-Statistic) = 0.032361

R-Squared = 0.203809

t-Statistic = in parentheses

** = Statistical significance at 0.01 level

From SCC equation, F-Statistic is 2.662193 and Prob (F-Statistic) is 0.032361, meaning that at least one independent variable significantly affects SCC stock return. R-Squared of 20.38% exhibits that all the independent variables in the model help explain the dependent variable 20.38%, the rest 79.62% can be explained by other factors. Referring to t-Statistics, which are numbers in parentheses, only EX significantly affects SCC stock return at the 99 percent confidence level. In addition to the statistically significant variable, the coefficient of EX is -1.292817, meaning that, when other variables are constant, one percentage change in exchange rate makes SCC stock return changes 1.292817% in the opposite direction.

SCCC = -0.490728 - 2.000032**EX** + 5.712360**CPI** - 1.779159**CMPI** - 0.043105**OIL**

(-0.677305) (-3.168270)** (1.343081) (-1.195254) (-0.344732)

F-Statistic = 2.661324

Prob(F-Statistic) = 0.032406

R-Squared = 0.203756

t-Statistic = in parentheses

** = Statistical significance at 0.01 level

From SCCC equation, F-Statistic is 2.661324 and Prob(F-Statistic) is 0.032406, meaning that at least one independent variable significantly affects SCCC stock return. R-Squared of 20.38% exhibits that all the independent variables in the model help explain the dependent variable 20.38%, the rest 79.62% can be explained by other factors. Referring to t-Statistics, which are numbers in parentheses, only EX significantly affects SCCC stock return at the 99 percent confidence level. In addition to the statistically significant variable, the coefficient of EX is -2.000032, meaning that, when other variables are constant, one percentage change in exchange rate makes SCCC stock return changes 2.000032% in the opposite direction.

TPIPL = 0.823260 - 3.689223**EX** - 9.571713**CPI** - 3.029961**CMPI** + 0.546840**OIL**

(0.373112) (-2.159046)* (-0.887800) (-0.764632) (1.849595)

F-Statistic = 2.496058

Prob(F-Statistic) = 0.043064

R-Squared = 0.172240

t-Statistic = in parentheses

* = Statistical significance at 0.05 level

From TPIPL equation, F-Statistic is 2.496058 and Prob(F-Statistic) is 0.043064, meaning that at least one independent variable significantly affects TPIPL stock return. R-Squared of 17.22% exhibits that all the independent variables in the model help explain the dependent variable 17.22%, the rest 82.78% can be explained by other factors. Referring to t-Statistics, which are numbers in parentheses, only EX significantly affects TPIPL stock return at the 95 percent confidence level. In addition to the statistically significant variable, the coefficient of EX is -3.689223, meaning that, when other variables are constant, one percentage change in exchange rate makes TPIPL stock return changes 3.689223% in the opposite direction.

Conclusions and discussions

This study examines the effect of economic factors on stock returns of listed construction materials firms in Thailand by using the multiple regression with ordinary least square. The monthly data of stock returns (SCC, SCCC, and TPIPL) as well as economic factors (EX, CPI, CMPI, and OIL) during 2013-2017 are used. Table 5 summarizes the results.

Table 5 Summary of results

	SCC	SCCC	TPIPL
Constant	0.475398	-0.490728	0.823260
EX	-1.292817**	-2.000032**	-3.689223*
CPI	-1.421653	5.712360	-9.571713
CMPI	-0.361326	-1.779159	- 3.029961
OIL	0.064821	-0.043105	0.546840
F-Statistic	2.662193	2.661324	2.496058
R-Squared	0.203809	0.203756	0.172240

* = *Statistical significance at 0.05 level*

** = *Statistical significance at 0.01 level*

According to table 5, only percentage change in exchange rate (EX) significantly affects stock returns of SCC, SCCC, and TPIPL in the opposite direction. Thus, if there is an increase in percentage change in exchange rate, stock returns of SCC, SCCC, and TPIPL will decrease. On the other hand, if there is a decrease in percentage change in exchange rate, stock returns of SCC, SCCC, and TPIPL will increase. When Thai baht depreciates (an increase in percentage change in exchange rate, THB/USD), investors imply that Thai economy is not in a good condition so they reallocate their investment from stock market to other safer assets such as precious metal. As shown during the study period from 2013 to 2017, precious metal futures trading has been rising from 2,208,505 contracts in 2013 to 3,691,785 contracts in 2017, or an increase of 67.16%. (Thailand Futures Exchange, 2018) As a result from the reallocation, share prices went down, so as the stock returns. Therefore, an inverse relationship between percentage change in exchange rate and stock returns is found in this study, which is consistent with Tripathi and Kumar (2016), Kotha and Sahu (2016), Er and Vuran (2012), Butt et.al. (2010), Mugambi and Okech (2016), Lim and Sek (2014), and Tangjitprom (2012).

For implication, the government has to be very careful when making decisions on policies regarding exchange rate. For example, if policy-makers initiate less expensive home currency compared to foreign currencies in order to enhance the export sector, this will hurt the stock market performance. Moreover, in order for cement firms to steady their earnings, they have to hedge against foreign exchange exposure. Finally, investors, who are interested in stocks in the construction materials sector, may consider exchange rate movement as an investment indicator.

Future research should examine other economic variables besides the ones used in this study. Also, the firms' internal performance variables such as financial ratios should be tested whether they impact stock returns of firms in the construction materials sector. Furthermore, future research may apply the same economic factors investigated in this study with firms in other business sectors in the Stock Exchange of Thailand, or with listed firms in other countries.

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