FACTORS EFFECTING THE STOCK INDEX RETURNS IN ASIA EMERGING MARKET

[1]ANASPREE CHAIWAN, [2]CHAIWAT NIMANUSSORNKUL

[1,2]Faculty of Economics, Chiang Mai University, Chiang Mai 50200, Thailand
E-mail: [1]anaspree@gmail.com

The real sector and financial sector are important to economy. Both sectors effect and be effected to economic variables especially financial sector. There is more fluctuation in financial sector than real sector. Therefore, the understanding of the economic variables that effect to the financial sector is useful for investors, speculators, or policy makers. Hence, this paper estimates the effect of economic variables on 8 Asia emerging stock market index return by using the daily data from December 1, 2015 to October 31, 2018. The ordered probit model reports that FTSE100 index has the positive effects on all Asia emerging stock market except Sri Lanka. While gold prices and US dollar index have negative effects in some stock markets. Moreover, the crude oil prices is effect to Malaysia stock market. Therefore, to invest or regulate the Asia emerging stock market, the investors and regulators have to concern about the change in gold prices, US dollar index, crude oil prices, and especially FTSE 100 index returns.

I. INTRODUCTION

Recently, the real outputs are not only so important to the economic growth, but also the financial markets that provide the sources of capitals to the real sectors. Between, the financial markets are much fluctuated especially the emerging stock markets. Thailand, for example, the equity indices have ever been to the highest at 147.18 annual percentage change in 2003 and fluctuated to be a 25.78 annual percentage change in 2017. Thailand's stock market has an average annual percentage change of the equity indices about 11.40% (The World Bank, 2018). Malaysia, for another example of the emerging stock market, it was the highest annual percentage change at 46.65 in 2009. Then, it decreased to 35.06% change in 2010 and turned to be a negative change. Malaysia's stock market became to be a positive change again in 2017 to 25.26% (The World Bank, 2018). There are many factors that affect these market fluctuations especially the key macroeconomic variables such as crude oil prices, the gold prices, US dollar index, the interest rates, the exchange rates, the inflation, etc. There are the relationships among stock markets and the macroeconomic variables; the exchange rates, and the inflation as shown in the study of Megaravalli and Sampagnaro (2018). Consistency with the study of Gurloveleen and Bhatia (2015), this study also showed the relationship between the exchange rate and the functioning of the stock market of India. Kang, Ratti, and Yoon (2015) studied the impact of the shock of the oil prices on the stock market returns in the developed country. They found that there were both negative (demand-side) and positive (supply-side) effects of the oil prices shock on the stock market returns and volatility.

Therefore, it is very important for both investors and speculators to understand the impacts of key macroeconomic factors on the stock market returns. Hence, the purpose of this paper is to determine the impacts of macroeconomics variables influencing the stock index returns in the emerging stock markets. The analysis would be contributed to not directly only to the investors and fund managers, but also to the policymakers who concerning about the stability and efficiency of the economy.

II. MODEL SPECIFICATION

The ordered probit model is used for the discrete outcomes and the outcomes or choices can ordered. This model is widely used for analyze and built around a latent regression as the binomial probit model (Greene, 2003). The ordered probit model is as followings:

$$y^* = x'\beta + \varepsilon \quad (1)$$

and

$$\begin{aligned} y &= 0 \quad if \quad y^* \le 0, \\ y &= 1 \quad if \quad 0 \le y^* \le \mu_1, \\ y &= 2 \quad if \quad \mu_1 \le y^* \le \mu_2, \\ &\text{M} \\ y &= J \quad if \quad \mu_{J-1} \le y^*. \end{aligned} \quad (2)$$

where y^* is unobserved, x is a vector of measurable independence variables, β is a vector of estimable parameters associated with x, μs are unknown parameters to be estimated with β, and ε is normally distributed across observations.

On the basis of equation (2), the normalization the mean and variance of ε to zero and one will obtain the probability corresponding to ordered outcomes that are expressed as:

$$\begin{aligned}
&\text{Prob}(\text{y}=0|x)=\Phi(-x'\beta),\\
&\text{Prob}(\text{y}=1|x)=\Phi(\mu_1-x'\beta)-\Phi(-x'\beta),\\
&\text{Prob}(\text{y}=2|x)=\Phi(\mu_2-x'\beta)-\Phi(\mu_1-x'\beta), \qquad (3)\\
&\quad \text{M}\\
&\text{Prob}(\text{y}=J|x)=1-\Phi(\mu_{J-1}-x'\beta).
\end{aligned}$$

The model is employ the maximum likelihood estimation technique to estimate the model parameters. However, the marginal effects of the independence variables on the probabilities are not equal to the coefficients. Therefore, the first derivatives of equation (3) with respect to independence variables are calculated as the marginal effects. The marginal effects of changes in the independence variables are presented in equation (4)

$$\begin{aligned}
&\frac{\partial\,\text{Prob}(\text{y}=0|x)}{\partial x}=-\phi(x'\beta)\beta,\\
&\frac{\partial\,\text{Prob}(\text{y}=1|x)}{\partial x}=[-\phi(x'\beta)-\phi(\mu_1-x'\beta)]\beta,\\
&\frac{\partial\,\text{Prob}(\text{y}=2|x)}{\partial x}=[-\phi(\mu_1-x'\beta)-\phi(\mu_2-x'\beta)]\beta,\\
&\quad \text{M}\\
&\frac{\partial\,\text{Prob}(\text{y}=J|x)}{\partial x}=\phi(\mu_{J-1}-x'\beta)\beta
\end{aligned}$$

III. DATA

The paper investigate the effects of five independence variables, namely Dow Jones Industrial index returns (DJI), FTSE 100 index returns (FTSE), gold price returns (GOLD), Crude oil price returns (OIL), and US dollar index returns (USD), on the 8 Asia emerging stock markets index returns, namely India, Sri Lanka, Indonesia, Malaysia, Pakistan, the Philippines, Thailand, and Vietnam. The ordered probit is employed to estimate the effects. The Asia emerging stock markets returns is categorized in 4 categories which is 0 if the stock index returns is less than -1, 1 if the stock index returns is between -1 and 0, 2 if the stock index returns is between 0 and 1, and 3 if the stock index returns is more than 1. The data of all variables are daily data from December 1, 2015 to October 31, 2018.

IV. EMPIRICAL RESULTS

The estimation of ordered probit model of stock index returns in emerging markets are shown in table 1-8. The returns of FTSE100 index has the effect to all emerging stock markets in Asia except Sri Lanka stock market. There is the positive effects of the change in FTSE100 on the change in Asia stock index returns. This means when the FTSE100 increasing 1 percent, the probability of positive returns in emerging market will increase around 5-17 percent. India, Thailand, Malaysia and the Philippines stock markets are effected by FTSE100 more than Indonesia, Vietnam, and Pakistan. Moreover, Indonesia, Pakistan, the Philippines, and Vietnam stock markets are only effected by the FTSE100. Therefore, the investors or speculators have to concern about the FTSE100 when they invest in these four stock markets. The changing in gold prices impact on the returns of India and Thailand stock market. Raising in gold price leads to increasing in probability of negative returns in these two stock market index about 4 percent. As same as the US dollar index, it makes the probability of negative return in Malaysia and Thailand stock markets increase if US dollar index increase. While the crude oil prices effect to the stock market of Malaysia in the opposite direction that means when the crude oil prices is increasing, the probability of positive returns in Malaysia stock market will decrease around 2 percent.

Table 1: Ordered probit estimates on stock market index of India

Variable	Coefficient	Standard Error	Marginal Effects			
			Y=00	Y=01	Y=02	Y=03
DJI	0.0507	0.0609	-0.0067	-0.0132	0.0138	0.0061
FTSE	**0.4327**	**0.0590**	-0.0575	-0.1130	0.1180	0.0525
GOLD	**-0.1026**	**0.0617**	0.0136	0.0268	-0.0280	-0.0125
OIL	-0.0099	0.0196	0.0013	0.0026	-0.0027	-0.0012
USD	-0.0021	0.1132	0.0003	0.0005	-0.0006	-0.0003
Constant	**1.4755**	**0.0539**				
Mu(1)	**1.3257**	**0.0551**				
Mu(2)	**3.0256**	**0.0756**				

Note: Entries in bold are significant

Table 2: Ordered probit estimates on stock market index of Sri Lanka

Variable	Coefficient	Standard Error	Marginal Effects			
			Y=00	Y=01	Y=02	Y=03
DJI	**-0.1116**	**0.0645**	0.0036	0.0409	-0.0388	-0.0057
FTSE	-0.0337	0.0613	0.0011	0.0124	-0.0117	-0.0017
GOLD	0.0284	0.0635	-0.0009	-0.0104	0.0099	0.0015

OIL	**0.0478**	**0.0206**	-0.0016	-0.0175	0.0166	0.0025
USD	0.0158	0.1172	-0.0005	-0.0058	0.0055	0.0008
Constant	**2.2415**	**0.0825**				
Mu(1)	**2.2765**	**0.0847**				
Mu(2)	**4.2658**	**0.1062**				

Note: Entries in bold are significant

Table 3: Ordered probit estimates on stock market index of Indonesia

Variable	Coefficient	Standard Error	Marginal Effects			
			Y=00	Y=01	Y=02	Y=03
DJI	0.0310	0.0603	-0.0044	-0.0077	0.0074	0.0047
FTSE	**0.2384**	**0.0578**	-0.0337	-0.0593	0.0566	0.0363
GOLD	-0.0085	0.0593	0.0012	0.0021	-0.0020	-0.0013
OIL	-0.0155	0.0193	0.0022	0.0039	-0.0037	-0.0024
USD	-0.0878	0.1092	0.0124	0.0218	-0.0208	-0.0134
Constant	**1.4363**	**0.0519**				
Mu(1)	**1.2256**	**0.0520**				
Mu(2)	**2.8284**	**0.0695**				

Note: Entries in bold are significant

Table 4: Ordered probit estimates on stock market index of Malaysia

Variable	Coefficient	Standard Error	Marginal Effects			
			Y=00	Y=01	Y=02	Y=03
DJI	0.0318	0.0631	-0.0022	-0.0104	0.0109	0.0017
FTSE	**0.3767**	**0.0609**	-0.0263	-0.1229	0.1291	0.0201
GOLD	-0.0035	0.0622	0.0002	0.0011	-0.0012	-0.0002
OIL	**-0.0444**	**0.0203**	0.0031	0.0145	-0.0152	-0.0024
USD	**-0.2052**	**0.1149**	0.0143	0.0670	-0.0703	-0.0109
Constant	**1.8625**	**0.0698**				
Mu(1)	**1.7471**	**0.0722**				
Mu(2)	**3.8743**	**0.1045**				

Note: Entries in bold are significant

Table 5: Ordered probit estimates on stock market index of Pakistan

Variable	Coefficient	Standard Error	Marginal Effects			
			Y=00	Y=01	Y=02	Y=03
DJI	-0.0462	0.0591	0.0082	0.0101	-0.0082	-0.0100
FTSE	**0.1326**	**0.0563**	-0.0235	-0.0289	0.0236	0.0288
GOLD	-0.0546	0.0589	0.0097	0.0119	-0.0097	-0.0119
OIL	-0.0061	0.0190	0.0011	0.0013	-0.0011	-0.0013
USD	-0.1461	0.1086	0.0258	0.0319	-0.0260	-0.0318
Constant	**1.2762**	**0.0468**				
Mu(1)	**1.1366**	**0.0465**				
Mu(2)	**2.3770**	**0.0592**				

Note: Entries in bold are significant

Table 6: Ordered probit estimates on stock market index of the Philippines

Variable	Coefficient	Standard Error	Marginal Effects			
			Y=00	Y=01	Y=02	Y=03
DJI	-0.1047	0.0597	0.0226	0.0189	-0.0195	-0.0221
FTSE	**0.3342**	**0.0571**	-0.0723	-0.0605	0.0623	0.0705
GOLD	-0.0846	0.0596	0.0183	0.0153	-0.0158	-0.0178
OIL	-0.0063	0.0190	0.0014	0.0011	-0.0012	-0.0013
USD	-0.0916	0.1101	0.0198	0.0166	-0.0171	-0.0193
Constant	**1.1073**	**0.0457**				
Mu(1)	**1.0144**	**0.0449**				
Mu(2)	**2.2351**	**0.0600**				

Note: Entries in bold are significant

Table 7: Ordered probit estimates on stock market index of Thailand

Variable	Coefficient	Standard Error	Marginal Effects			
			Y=00	Y=01	Y=02	Y=03
DJI	0.0124	0.0615	-0.0013	-0.0036	0.0035	0.0013
FTSE	**0.3970**	**0.0594**	-0.0402	-0.1144	0.1115	0.0431
GOLD	**-0.1067**	**0.0626**	0.0108	0.0307	-0.0300	-0.0116
OIL	0.0167	0.0197	-0.0017	-0.0048	0.0047	0.0018
USD	**-0.2232**	**0.1155**	0.0226	0.0643	-0.0627	-0.0242
Constant	**1.6478**	**0.0581**				
Mu(1)	**1.4357**	**0.0595**				
Mu(2)	**3.2686**	**0.0798**				

Note: Entries in bold are significant

Table 8: Ordered probit estimates on stock market index of Vietnam

Variable	Coefficient	Standard Error	Marginal Effects			
			Y=00	Y=01	Y=02	Y=03
DJI	0.0820	0.0600	-0.0145	-0.0172	0.0143	0.0175
FTSE	**0.1542**	**0.0568**	-0.0273	-0.0323	0.0268	0.0329
GOLD	-0.0187	0.0594	0.0033	0.0039	-0.0032	-0.0040
OIL	0.0165	0.0191	-0.0029	-0.0035	0.0029	0.0035
USD	-0.1129	0.1096	0.0200	0.0237	-0.0196	-0.0241
Constant	**1.2651**	**0.0477**				
Mu(1)	**1.0285**	**0.0464**				
Mu(2)	**2.3928**	**0.0610**				

Note: Entries in bold are significant

CONCLUSION

The paper estimates the effect of Dow Jones Industrial index returns, FTSE 100 index returns, gold price returns, crude oil price returns, and US dollar index returns on the Asia emerging stock market index return, namely India, Sri Lanka, Indonesia, Malaysia, Pakistan, the Philippines, Thailand, and Vietnam. The daily returns of those dependence and independence variables from December 1, 2015 to October 31, 2018 are used to investigate the impact of independence variables on dependence variables by employing the ordered probit model. The results shown the positive impact of FTSE100 index on all Asia emerging stock market except Sri Lanka. Whereas the negative impacts of gold prices on India and Thailand stock market, and US dollar index on Malaysia and Thailand stock market is found. Crude oil prices effect only on Malaysia stock market. Therefore, anyone who invests in Asia emerging stock markets have to consider the change in gold prices, US dollar index, crude oil prices, and especially FTSE 100 index returns.

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