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RELATIONSHIP BETWEEN STOCK MARKET RETURNS AND EXCHANGERATES IN EMERGING STOCK MARKETS

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Abstract- *This paper aims to study the relationship between stock market returns and exchange rates in emerging stock markets including Malaysia, Singapore, Thailand, Indonesia and Philippines. The data is taken from January 2003 to December 2012 using weekly closing indices and separated in two periods; before (2003-2007) and second, after (2008-2012) the financial crisis of 2008. Johansen-Juselius (JJ). Granger causality tests show that unidirectional causality exists between the stock market returns and exchange rates for Thailand before the financial crisis, whilst, for Indonesia and Singapore, the unidirectional causality between the two variables is detected in the period after the financial crisis. Error Correction Model (ECM) indicates the existence of long run causality between the two variables for Philippines. This study also finds that most of the emerging stock markets are informationally inefficient.*

Keywords : *Stock Market, Exchange Rates, ASEAN, Co-Integration, Causality.*

Abstrak : Penelitian ini bertujuan untuk mempelajari hubungan antara return pasar saham dan nilai tukar di pasar saham negara berkembang termasuk Malaysia, Singapura, Thailand, Indonesia dan Filipina. Data tersebut diambil dari Januari 2003 hingga Desember 2012 dengan menggunakan indeks penutupan mingguan dan dipisahkan dalam dua periode; sebelum (2003-2007) dan kedua, setelah (2008-2012) krisis keuangan tahun 2008. Johansen-Juselius (JJ). Tes Kausalitas Granger menunjukkan bahwa kausalitas searah ada antara return pasar saham dan nilai tukar untuk Thailand sebelum krisis keuangan, sementara, untuk Indonesia dan Singapura, kausalitas searah antara dua variabel terdeteksi pada periode setelah krisis keuangan. Error Correction Model (ECM) menunjukkan adanya jangka panjang kausalitas antara dua variabel untuk Filipina. Studi ini juga menemukan bahwa sebagian besar pasar saham emerging informationally tidak efisien.

Kata kunci : Pasar Saham, Nilai Tukar, ASEAN, Co-Integrasi, Kausalitas

INTRODUCTION

One of the important issues in the financial economics area that the scholars and economist are investigating is whether the prediction of market returns is possible or not. Therefore, the issue can be related to the Efficient Market Hypothesis (EMH). In its strong form, EMH expressed that the stock prices, at any given time, fully reflect all the available information. It means that stock price reflects all information, both public and private information. The normal conduct of

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investors guarantees that past and current data is completely reflected in present stock prices. It can be stated that when there are no systematic ways to obtain higher rates of return, and then the stock market is efficient (Fama, 1970). In line with this conclusion, another study found that the investors are unable to gain more profit than normal through the prediction the movements of future stock (Chong and Goh, 2003). Analysis of dynamic interactions over post-sample period by Impulse-Response Functions and Variance Decomposition indicate that movements in TASE Index do influence the performance of PEX (Suryanto, T., & Abdul Hadi, A. R, 2015). In conclusion, as the market efficient, prediction of current (future) stock prices is not possible, although we have information on the past (current) levels of economic activities.The ASEAN countries such as Malaysia, Singapore, Thailand, Philippines and Indonesia can be conceived as the emerging stock markets. Their stock market operation was indicated by their market index, respectively. In sequences, the stock markets were handled by their Exchange is known as Bursa Malaysia (BURSA), Singapore Exchange (SGX), Stock Exchange of Thailand (S.E.T), Philippines Stock Exchange (PSE) and Indonesia Stock Exchange (IDX).The formation of Malayan Stock Exchange (MSE) in 1960, initiated the establishment of Bursa Malaysia in 1960, regardless of the fact that the real history start since 1930s. MSE is then known as the Stock Exchange of Malaysia (SEM) in 1963. However, the SEM again changed its name in 1973 to the Stock Exchange of Malaysia and Singapore. This is imputable to the secession of Singapore from Malaysia. Subsequently, the StockExchange of Malaysia and Singapore was separated into two stock exchanges 1) the Kuala Lumpur Stock Exchange Berhad and 2) the Stock Exchange of Singapore. Today, Bursa Malaysia became one of the biggest bourses in Asia. At the end of February 2014, 1,145 companies have been listed in BursaMalaysia and the combination of market capitalized approximately about $235.28 billion.In 1912, the first Stock Exchange in Indonesia was initiated by the Dutch East Indies in Batavia (currently known as Jakarta). Nevertheless, between 1914 until 1977, the capital market was inactive. In 1977, the capital market was reactivated by Indonesian government.During the initial stage, 24 companies was listed on JSX. Surabaya Stock Exchange (SSE) was merged into Jakarta Stock Exchange (JSX) in 2007. This study focuses on the emerging stock markets such as ASEAN stock markets.The purpose of this study is to extend current literature regarding relationship between exchange rate and stock market returns by exploring the issue in ASEAN emerging markets. Having better understanding the exchange rate effect on the stock return and volatility, investor will be able to

make better decisions by forecasting the exchange rate movement. Several techniques can be used to forecast the movement such as technical forecasting, fundamental forecasting or market based forecasting. As a result, investors have advantage to manage their risk, concern with the exchange rates. The specific objectives for this study are:

1. To determine the existence of long run relationship between the exchange rates and stock market returns for emerging stock markets.
2. To determine the existence of causality between the exchange rates and stock market returns for emerging stock markets.
3. To determine the causal direction of the exchange rates and stock market returns for emerging stock markets, if exist.

In the emerging stock markets such as ASEAN, countries like Malaysia, Singapore, Thailand, Indonesia and Philippines, the trade activities are increasing. Subsequently, changes in exchange rate also change the relative prices of goods, which affect trade balances and accumulation of foreign assets. Kim (2003) communicates that proceedings on the world exchange and capital development has led to the exchange rate being one of the important components of business productivity.The research questions are as follows:

1. Is there a long run relationship between the exchange rates and stock market returns for emerging market?
2. Are there any causal relationship between the exchange rates and stock market returns for emerging market?
3. Where is the causal direction between the exchange rates and stock market returns for emerging market, if it exists?

LITERATURE REVIEW

Efficient Market Hypothesis (EMH)

The efficient market hypothesis (EMH) evolved in the 1960s from a Ph.D. dissertation written by Fama (1965) who persuasively made the argument that in an active market that includes many well-informed and intelligent investors, security will be appropriately priced and reflect all available information. In his later study, Fama (1970) express that there are three forms of the EMH. First, the weak form efficiency. The stock prices fully reflect historical market information that includes all known data on companies' price, volume and information and related fundamental facts. Second, the semi strong form efficiency. The stock price fully reflects all public information includes company announcements and published reports, found in printed media and electronic media. Third, the strong form efficiency. The stock prices reflect all information, both public and information that is available to corporate insiders, but has not yet been made public (private information).

INTERACTIONBETWEEN EXCHANGE RATE AND STOCK MARKET VOLATILITY

Theoretically, the interaction between exchange rate and stock market volatility has been studied via two models. The first model was based on a macroeconomic foundation while second model was based on microeconomic foundations.The first model which is the "Flow-Oriented" model or traditional approach suggests that changes in exchange rate will prompt changes in stock prices (Dornbusch and Fischer, 1980 and Gavin, 1989).

DATA AND METHODOLOGY

The data used for this study consist of weekly closing exchange rates and stock market indices for ASEAN countries include Malaysia, Singapore, Indonesia, Thailand and Philippines. The stock market indices on monthly basis used to compute stock market returns, while local currency/US Dollar on monthly basis used to compute exchange rates. The stock indices of the countries used are FBM Kuala Lumpur Composite Index (FBMKLCI), Straits Times Index (STI), IDX composite, SET Index and PSE Index (PSEI). The data was divided into two periods. First, five years of data (2003 to 2007) before the financial crisis of 2008. Second, five years of data (2008 to 2012) after the financial crisis of 2008. Hence, the sample period runs from 2003 to 2012, yielding total of 261 observations for each country. This period is selected, since we want to find out whether there is any possibility that the relationship between the stock market returns and exchange rates movement was affectyed on by the US financial crisis.

RESULT

In the discussions for the findings, countries will be represented by their appropriate currency and market indices. Therefore, RM, PESO, SGD, BAHT and RUPIAH will be used to represent exchange rates against USD, whilst KLCI, STI, SET, IDX and PSEI will represent stock market returns for the respective country.

CO-INTEGRATION TEST

From the unit root tests, we found that both exchange rates and stock market returns series is integrated at first difference or $I(1)$, hence, we may continue with the co-integration test to study whether there is a long run relationship exists between the exchange rate movement and stock market returns for emerging market. The test conducted using JJ Test. The JJ Test result for the data before the financial crisis is presented in Table 1. The result indicates that, for the long run, both series are not co-integrated. As an explanation, we may conclude that the existence of long run equilibrium for all the series before the financial crisis cannot be obtained.Hence, the null hypothesis for the present study that no long run relationship exist between exchange rates and stock market returns could not be rejected for all cases.

Table 1
Co-integration Result before Financial Crisis

Variables	Null Hypothesis	Trace	5 percent CV	Prob.
BAHT, SET	Ho: r = 0	7.034322	15.49471	0.5736
	Ho: r ≤ 1	0.241286	3.841466	0.6233
IDX, RUPIAH	Ho: r = 0	13.57404	15.49471	0.0954
	Ho: r ≤ 1	1.702238	3.841466	0.1920
KLCI, RM	Ho: r = 0	7.632512	15.49471	0.5055
	Ho: r ≤ 1	1.620074	3.841466	0.2031
PESO, PSEI	Ho: r = 0	7.827383	15.49471	0.4840
	Ho: r ≤ 1	0.464577	3.841466	0.4955
SGD, STI	Ho: r = 0	8.841066	15.49471	0.3803
	Ho: r ≤ 1	0.013831	3.841466	0.9062

Variables	Null Hypothesis	Eigen	5percent CV	Prob.
BAHT, SET	Ho: r = 0	6.793036	14.26460	0.5139
	Ho: r ≤ 1	0.241286	3.841466	0.6233
IDX, RUPIAH	Ho: r = 0	11.87180	14.26460	0.1156
	Ho: r ≤ 1	1.702238	3.841466	0.1920
KLCI, RM	Ho: r = 0	6.012438	14.26460	0.6116
	Ho: r ≤ 1	1.620074	3.841466	0.2031
PESO, PSEI	Ho: r = 0	7.362806	14.26460	0.4471
	Ho: r ≤ 1	0.464577	3.841466	0.4955
SGD, STI	Ho: r = 0	8.827235	14.26460	0.3008
	Ho: r ≤ 1	0.013831	3.841466	0.9062

The JJ Test result for data after financial crisis remain the same, all series are not co-integrated in the long run except for Philippines. The JJ Test results after financial crisis are presented in Table 2. For Philippines, both Trace Statistic and Maximum Eigen Statistic indicates that the null hypothesis which is no long run relationships exist between exchange rate and stock market returns (no co-integration) for PESO and PSEI series can be rejected at 5 percent critical value. It indicates that at most 1 co-integration exist between the variables. Therefore, a long run relationship exists for Philippines.The finding has been similar to Abdalla and Murinde (1997). In their study, they examine association between the stock price index and the real effective exchange rate in the long run for Philippines. They used a co-integration approach in their study. Their result indicates there are a long run association between stock price index and the real effective exchange rate. Subsequently, they also use ECM for causality analysis due to the long run association.

Table 2
Co-integration Result after Financial Crisis

Variables	Null Hypothesis	Trace	5 percent CV	Prob.
BAHT, SET	Ho: r = 0	4.319672	15.49471	0.8761
	Ho: r ≤ 1	0.540529	3.841466	0.4622
IDX, RUPIAH	Ho: r = 0	5.429916	15.49471	0.7616
	Ho: r ≤ 1	0.000261	3.841466	0.9891
KLCI, RM	Ho: r = 0	14.71503	15.49471	0.0653
	Ho: r ≤ 1	0.522997	3.841466	0.4696
PESO, PSEI	Ho: r = 0	17.08851	15.49471	0.0285
	Ho: r ≤ 1	0.007631	3.841466	0.9299
	Ho: r = 0	8.717535	15.49471	0.3922
SGD, STI	Ho: r ≤ 1	0.725893	3.841466	0.3942

Variables	Null Hypothesis	Eigen	5percent CV	Prob.
BAHT, SET	Ho: r = 0	3.779144	14.26460	0.8819
	Ho: r ≤ 1	0.540529	3.841466	0.4622
IDX, RUPIAH	Ho: r = 0	5.429656	14.26460	0.6869
	Ho: r ≤ 1	0.000261	3.841466	0.9891
KLCI, RM	Ho: r = 0	14.19203	14.26460	0.0513
	Ho: r ≤ 1	0.522997	3.841466	0.4696
PESO, PSEI	Ho: r = 0	17.08088	14.26460	0.0175
	Ho: r ≤ 1	0.007631	3.841466	0.9299
	Ho: r = 0	7.991642	14.26460	0.3796
SGD, STI	Ho: r ≤ 1	0.725893	3.841466	0.3942

Miller (1991) and Miller and Russek (1990) states that; if two variables co-integrated, hence, temporal causality in Granger sense in at least one direction must be exist between the two variables. Therefore, further investigation was carried out to study the causal direction using Error Correction Model (ECM). On the other hand, there could be just short run associations between variables because of the absence of co-integration, which might be resolved utilizing a standard Granger causality test.

CAUSALITY TEST

Granger Causality test result is presented in Table 3. It is result of the null hypothesis of causality on the exchange rate and stock market returns before the financial crisis. For Thailand, the null hypothesis SET does not Granger-cause BAHT can be rejected at the 10 percent significance level. As such, the outcomes of the Granger causality test show that stock market return Granger-cause the exchange rate. This indicates unidirectional causality running from stock market returns comes back to exchange rates.The finding aligns with the second model which is the "Stock Oriented" model or portfolio approach emphasizes on the role of capital account transaction (Branson, 1983 and Frankel, 1983). This model suggests that fluctuation of stock prices influences the volatility of exchange rate.Furthermore, the discovering likewise like a study directed by Granger, Huang and Yang (1998).Their study shows that exchange rate leads stock prices with positive correspondence for Thailand. Be that as it may, these effects appear differently in relation to different past experimental study conducted by Griffin (2004). Griffin expressed that foreign flow are significant indicators returns in Thailand.

Table 3
Causality Result before Financial Crisis

Null hypothesis	F Statistics	P Value	Conclusion
SET does not Granger Cause BAHT	2.60294	0.0760	Reject
BAHT does not Granger Cause SET	0.24133	0.7858	Accept
RUPIAH does not Granger Cause IDX	1.52254	0.2201	Accept
IDX does not Granger Cause RUPIAH	0.02577	0.9746	Accept
RINGGIT does not Granger Cause KLCI	0.94949	0.3883	Accept
KLCI does not Granger Cause RINGGIT	1.39327	0.2502	Accept
PSEI does not Granger Cause PESO	1.53852	0.2167	Accept
PESO does not Granger Cause PSEI	0.04481	0.9562	Accept
STI does not Granger Cause SGD	0.36555	0.6942	Accept
SGD does not Granger Cause STI	0.05134	0.9500	Accept

However, for the remaining countries, the null hypothesis either stock markets returns does not Granger Cause Exchange rates or Exchange rates does not Granger cause stock markets returns cannot be rejected at any significance level. It might be inferred that there are no causality relationship between stock markets returns and exchange rates.Meanwhile, Table 4 shows the Granger Causality test that result on the null hypothesis of

causality on the exchange rate and stock market returns after the financial crisis.

Table 4
Causality Result after Financial Crisis

Null hypothesis	F Statistics	P Value	Conclusion
SET does not Granger Cause BAHT	0.88948	0.4121	Accept
BAHT does not Granger Cause SET	1.94641	0.1449	Accept
RUPIAH does not Granger Cause IDX	3.55740	0.0299	Reject
IDX does not Granger Cause RUPIAH	0.97199	0.3797	Accept
RINGGIT does not Granger Cause KLCI	2.31742	0.1006	Accept
KLCI does not Granger Cause RINGGIT	0.89531	0.4098	Accept
PSEI does not Granger Cause PESO	1.55103	0.2140	Accept
PESO does not Granger Cause PSEI	0.98241	0.3758	Accept
STI does not Granger Cause SGD	0.38925	0.6780	Accept
SGD does not Granger Cause STI	4.37511	0.0135	Reject

For Indonesia, the null hypothesis on RUPIAH does not Granger-cause IDX can be rejected at 5 percent significance level. This implies that the RUPIAH Granger-cause IDX. It shows unidirectional causality running from exchange rate to stock market return. Like Indonesia, the null hypothesis on SGD does not Granger-cause STI for Singapore also can be rejected at 5 percent significance level. Similar with Indonesia, the result shows unidirectional causality running from exchange rates to stock market returns. Figure 3 shows a line plot of stock market returns (STI) and exchange rates (SGD) data for Singapore after financial crisis.In general, the increments in the exchange rate (SGD depreciate against USD) cause a decline in the stock market return of STI. This is similar with Indonesia.Hence, for both Indonesia and Singapore, it proved that the unidirectional causality running from exchange rate to stock market returns. The findings align with first model which is the "Flow-Oriented" model or traditional approach suggests that changes in exchange rate will lead to changes in stock prices (Dornbusch and Fischer, 1980 and Gavin, 1989). Further clarification, a variation in the exchange rates might influence a company's outside business including general benefits that might, thusly, influence its stock costs, contingent upon the multinational characteristics of the firm.However, for the remaining countries, the null hypothesis either stock markets returns does not

Granger-cause exchange rates or exchange rates does not Granger-cause stock markets returns cannot be rejected at any significance level.Therefore the null hypothesis for present study which states that no causality exists between exchange rates and stock market returns can be rejected for Thailand for the case before financial crisis. However, after financial crisis, the null hypothesis can be rejected for Indonesia and Singapore.

ERROR CORRECTION MODEL (ECM) RESULT

As mentioned before, there must be the existence of temporal causality in the Granger sense between the two variables in at least one direction if they co-integrated. Therefore, result for Philippines expected to exhibit temporal causality due to the existence of co-integration. However, from the Granger causality test, the null hypothesis either PSEI does not Granger-cause PESO or PESO does not Granger- cause PSEI cannot be rejected at any significance level. Means no causality exists between the PSEI and PESO. The results are contrast with the expectation. This cause by the presence of co-integration between PESO and PSEI identifies an additional channel which unable to be detected by the standard Granger causality test.Further explanation, if temporal causality exists between the variables; this demonstrates two essential drives or channels that may affect the changes in the variables. One channel demonstrates the conformity taken by the variables to rectify any deviations from equilibrium path. Another channel shows the reaction of one variable because of the changes in another variable, which is seen as the short interactions between them. The suggestion for model determination is that standard Granger causality test are mis-specified if this second channel is not looked into. This could be settled utilizing an error correction model (Engle and Granger 1987).Therefore, for the case of Philippines, ECM shall be utilised to determine the causality relationship between PESO and PSEI. The following model will be used for further determination of causality relationship.

Model 1D(PESO) = C(1)*(PESO(-1) + 0.00209641355882*PSEI(-1) - 52.1279738655) + C(2)*D(PESO(-1)) + C(3)*D(PESO(-2)) + C(4)*D(PSEI(-1)) + C(5)*D(PSEI(-2)) + C(6)

Model 2D(PSEI) = C(1)*(PSEI(-1) + 477.005119431*PESO(-1) - 24865.3103994) + C(2)*D(PSEI(-1)) + C(3)*D(PSEI(-2)) + C(4)*D(PESO(-1)) + C(5)*D(PESO(-2)) + C(6)

First, is to determine long run causality relationship. The results for the error correction of coefficient are given in Table 5.

Table 5
Error Correction of Coefficient of Equation

Model	Error Correction	Coefficient	P value
Model 1, DV = PESO	C (1)	-0.065403	0.0002
Model 2 , DV = PSEI	C (1)	0.018933	0.0262

The result indicates that for Model 1, the coefficient has negative sign and the error correction term, C (1) is significance because P value is smaller than 5 percent. Therefore, there are long run causality exist from PSEI to PESO. Like the co-integration, this result also similar with Abdalla and Murinde (1997). For their study, they also apply the correction modelling approach to examine causality for Philippines. Their study showed that the exchange rates lead by the stock prices. Conversely, Model 2 result is not significance because the P value is greater than 5 percent. Hence, there are no long run causality exist from PESO to PSEI.For the short run causality determination, the result of Wald Statistic is presented in Table 6. Here, the null hypothesis cannot be rejected because P value is higher than 5 percent for both Model 1 and Model 2. Therefore, the null hypothesis for this test of jointly independent variables cannot influence dependent variable is accepted. This result indicates that no short run causality exist between the variables.

Table 6
Wald Coefficient Result for Short Run Causality

Model	Chi Square	P value
Model 1, DV = PESO	3.615530	0.1640
Model 2, DV = PSEI	3.809151	0.1489

Therefore, for Philippines, a long run causality running from stock market return to exchange rate. Like the co-integration, this result also similar with Abdalla and Murinde (1997). They also apply the correction modelingapproach to examine causality for Philippines. In their study, the result showed that the exchange rates leads by the stock market return.Therefore, similar with Indonesia and Singapore, the null hypothesis for present study which states that no causality exists between exchange rates and stock market returns can be rejected for Philippines for case before financial crisis.

CONCLUSION

The present study utilise JJ test and Granger Causality test to investigate the relationship between exchange rates and stock market returns in emerging stock markets. Besides, Error Correction Model (ECM) also used to determine causality for co-integrated variables. For the purpose of this analysis exchange rate and market

index from emerging stock markets; Malaysia, Indonesia, Philippine, Singapore and Thailand are observed.The findings demonstrated that there are no long run connections exist between exchange rates and stock market returns before the financial crisis. On the other hand, after the financial crisis, the consequence demonstrated that a long run relationship exists between exchange rate and stock market return in the Philippines. Implies, the variables is co-integrated in a long run.From the point of causality, the result indicates that there is causality in unidirectional. It runs from stock market return to exchange rate for Thailand before the financial crisis. However, after the financial crisis, the results shows that there is unidirectional causality exist in Indonesia and Singapore. The causal direction running from exchange rates to stock market returns. Meanwhile, for Philippines the result of ECM showed an existence of long run causality from stock market return to exchange rate. Conversely, ECM result also shows that there is no short run causality exists between the co-integrated variables.In addition, it also can be concluded that the financial crisis has significantly impact on the relationship between exchange rates and stock markets returns for some countries. As stated by Mishkin (2000), the exchange rate instability has suggestions for the monetary framework particularly for stock market of a nation. In comparison to the developed stock markets, the emerging stock markets are more volatile and more exposure regard to the financial crisis.

Finally, this analysis also indicates that before the financial crisis, stock market returns and exchange rates are not related to most of the countries. Following the financial crisis, for most countries, stock market returns and exchange rates can be related. The result also indicates that the stock markets in each country are informationally efficient before the financial crisis, except for Thailand. However, after the financial crisis, the result shows that most of the stock markets are inefficient.The investigation has imperative suggestions for the EMH and instructive part of stock price development. Since the stock exchange returns and exchange rates are connected in generally nations, therefore, the investors able to make use of the information obtain from one exchange rate to expect the behaviour of other stock market. As a result, we may conclude that the existence of co-integration or causality relationship between the stock market returns and exchange rates implies an informationally inefficient stock market. In this present study, stock market in Malaysia is more efficient compare to Singapore, Thailand, Philippines and Indonesia.

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