

THE IMPACT OF FINANCIAL CRISIS IN 2008 TO GLOBAL FINANCIAL MARKET: EMPIRICAL RESULT FROM ASIAN

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Abstract

This research examines the correlation between stock market and exchange rate return of eight Asian countries as *Taiwan, Malaysia, South Korea, Indonesia, Vietnam* from 2001 to 2015. Although the linkage between stock equity and exchange rate return affected through global financial crisis in 2008, its significances did not show obviousness of both short and long term. Following our empirical results, we found the existence of significances for bidirectional effect between two variables. Furthermore, we also estimated how long the relation lasts by using impulse response function. The Dynamic Conditional Correlation model's result showed the effect of financial crisis to the linkage in this research. In additions, we found that the "Debt crisis" affected to correlation between stock and exchange market.

In this study, we focus on finding the relation causal in time of the global finance crisis, from 2008 to 2009 and the repercussion of effect has lasted until now. This crisis challenged Asia countries in their currency policy and stock market. However, we treated it as an opportunity to examine the linkage between exchange rate and stock prices return in ASIAN area.

Key words: Global finance crisis, stock market return, exchange rates

JEL classifications: A10; F30; G15

Introduction

The relation between foreign currency and stock market is one of the most important economic factors. It usually uses to consider in designing the monetary policy or in forecasting the financial markets evolution. It is also an interesting topic for most of the financial press in the world. For example, in July 2015, Wall Street Journal issued an article that "China Moves to

Devalue Yuan". In the fact, this event made the crisis in short run for whole the worldwide financial market. In the domain of learning, there were very much scholars who already tried to analyze deeply this relation. However, I found that there are not too many studies analyzing the linkage between exchange rate and stock market during or after the financial crisis in 2008. At this crisis, high modification of stock market created role activity of investors and capital move to value and this one can direct to remarkable instability in different markets such as international exchange markets. This was described in the case of the Asian financial crisis when stock markets led the foreign exchange markets (Caporale, Pittis et al. 2002) and presented more by (Hatemi-J and Roca* 2005) to show the interaction between two or more different market. These are several authors analyzing the correlation stock equity and exchange rate such as (Caporale, Hunter et al. 2014). Recently, (Pan, Fok et al. 2007) and (Zhao 2010) found the multidirectional impact between stock and exchange. Furthermore (Solnik 1984) and (Ozair 2006) suggested that existing the correlation of stock equity and exchange rates return, but no relation in long-term. However, (Alhayky and Houdou 2009) argued that this relation will exist in long-term.

This study will analyze the correlation between stock equity and exchange rate from several ASIAN countries as *Taiwan, Malaysia, South Korea, Indonesia, Vietnam* from 2001 to 2015. We expect that the empirical results will support us answer some research questions:

- How is the correlation between stock equity and exchange rate in several ASIAN markets?
- How did the financial crisis in 2008 affect to several financial ASIAN markets?

The next following section will show the methodology. Section 2 is empirical results. Section 3 is conclusion.

1 Methodology

Firstly, we need to employ ADF (Dickey and Fuller 1979) and KPSS (Kwiatkowski, Phillips et al. 1992) test for data stationary. AIC (Akaike information criterion) and BIC (Schwarz or Bayesian information criterion) are used to find the lag value for correlation estimation. We will employ (Johansen 1991) for long-run relation and (Granger 1988) for two variables.

Furthermore, Dynamic conditional correlation (Engle 2002) model will help to forecast the correlation in a horizon time of data.

2 Empirical results

2.1 Data description

Tab. 1: Data description

	Mean	Median	Skewness	Kurtosis	ADF test	KPSS test	Jarque Bera
Malaysia	0.000168	0.000014	-0.915612	11.775213	-15.514**	0.0879	0
Indonesia	0.000551	0.000494	-0.693635	7.346379	-14.612**	0.1258	0
Taiwan	0.000030	0.000000	-0.275257	3.723708	-14.967**	0.1071	0
Korea	0.000251	0.000128	-0.515647	6.750586	-16.619**	0.0695	0
Vietnam	0.000442	0.000000	-0.254978	3.302334	-13.013**	0.1988	0

Source: From author's analysis by R-project

(*Dickey-Fuller test for unitt roots: $\Delta X_t = a_0 + p_0 X_{t-1} + \sum_{i=1}^k p_i \Delta X_{t-1} + e_t$. Lags is choosen by 1 in this test. *

and** interprets rejection of unit root hypothesis at 5% and 1% significant levels, respectively.

*KPSS test: The results denotes that the null hypothesis of trend stationarity can not reject at critical values at 10%; 5%, 2.5% and 1% significant levels, respectively.

*Jarque Bera test: The results denotes null hypothesis "The distribution is normal" can not reject with critical values as 0.347; 0.463; 0.574; 0.739 at 10%; 5%; 2.5% and 1%, respectively.)

Table 1 exhibits statistic description. The results of ADF (Dickey and Fuller 1979) and KPSS (Kwiatkowski, Phillips et al. 1992) test show that these are not any unit-root significances, or in another way, the data that used in this paper is stationary. The null hypothesis of JB test (Jarque and Bera 1980) cannot reject at most of results prove that the data's skewness and kurtosis fit with normal distribution well.

2.2 Johansen test

We need to choose lag value by using AIC (Akaike information criterion) and BIC (Schwarz or Bayesian information criterion). In the case, if the result of AIC and SBIC is different, SBIC will be more confident than AIC.

Tab. 2: Lag value selection

PANEL A: BEFORE FINANCIAL CRISIS					
First group	Var(1)	Var(2)	Var(3)	Var(4)	Var(5)
AIC	2.239338e+01	2.237437e+01	2.237442e+01	2.235060e+01	2.234949e+01
SBIC	2.241319e+01	2.240903e+01	2.242394e+01	2.241497e+01	2.242872e+01
Second group					
AIC	-0.8922220	-1.0175673	-1.0348824	-1.1669697	-1.1749074
SBIC	-0.8427072	-0.9267902	-0.9028429	-0.9936679	-0.9603433
PANEL B: DURING FINANCIAL CRISIS					
First group	Var(1)	Var(2)	Var(3)	Var(4)	Var(5)
AIC	2.545604e+01	2.542215e+01	2.539673e+01	2.534102e+01	2.530891e+01
SBIC	2.547585e+01	2.545681e+01	2.544624e+01	2.540539e+01	2.538814e+01
Second group					
AIC	3.253380	2.792897	2.718352	2.461175	2.426909
SBIC	3.302895	2.883674	2.850391	2.634477	2.641473
PANEL C: AFTER FINANCIAL CRISIS					
First group	Var(1)	Var(2)	Var(3)	Var(4)	Var(5)
AIC	2.465640e+01	2.461197e+01	2.460755e+01	2.455867e+01	2.456134e+01
SBIC	2.467621e+01	2.464663e+01	2.465706e+01	2.462304e+01	2.464057e+01
Second group					
AIC	2.063223	1.758975	1.719573	1.664583	1.626441
SBIC	2.112738	1.849752	1.851613	1.837885	1.841005

Source: From author's analysis by R-project

To analyze more obvious the relationship of stock equity and exchange rate, we will separate five ASIAN countries to two groups. Group one includes two countries are emerging markets such as Vietnam and Indonesia. Conversely, group two includes Taiwan, Korea and Malaysia. The result is showed in table 2. In the period that before ASIAN financial crisis, for the first group, AIC gives VAR model outcome with 4 lags for first group and 5 for second group, but SBIC suggest difference with 4 lag. Hence, we will choose 4 lags for both first and

second group before financial crisis. With the same rule, we will choose 5 and 4 lags for both group in during and after ASIAN financial crisis.

Tab. 3: Johansen test result

Before Financial Crisis			During Financial Crisis			After Financial Crisis			
Country	Trace	Eigenvalues	Trace	Eigenvalues	Trace	Eigenvalues			
Vietnam	r=0	18.7*	8.01E-03	-	-	-	r=0	18.41*	9.95E-03
	r≤1	1.05	8.01E-03	-	-	-	r≤1	7.64	9.95E-03
Malaysia	-	-	-	r=0	19.32*	0.0120	-	-	-
	-	-	-	r≤1	6.77	0.0120	-	-	-
Korea	-	-	-	r=0	19.16*	1.17E-02	r=0	17.91*	1.33E-02
	-	-	-	r≤1	6.93	1.17E-02	r≤1	3.55	1.33E-02

Source: From author's analysis by R-project

(Note: r=0, the critical value at 10%, 5% and 1% are 17.85, 19.96 and 24.6, respectively; r=1, the critical value at 10%, 5% and 1% are 7.52, 9.24 and 12.97, respectively)

From the result of table 3, the long-run significances just exist in Vietnam, Malaysia and Korea. It is interesting that the financial crisis seem not affect to the correlation between stock and exchange rate in Vietnam.

2.3 Granger test

Tab. 4: Granger test result

Panel A: Before Financial Crisis				
Country	Null Hypothesis	F-Statistic	Prob.	Conclusion
Taiwan	ST does not explain ER	1.0655	0.372	
	ER does not explain ST	34.719	<2.2e-16***	EX→ST
Malaysia	ST does not explain ER	2.2443	0.06203	
	ER does not explain ST	38.233	<2.2e-16***	EX→ST
Korea	ST does not explain ER	0.2323	0.9203	
	ER does not explain ST	42.684	<2.2e-16***	EX→ST
Indonesia	ST does not explain ER	0.7637	0.5488	

	ER does not explain ST	21.891	<2.2e-16***	EX→ST
Panel B: During Financial Crisis				
Country	Null Hypothesis	F-Statistic	Prob.	Conclusion
Taiwan	ST does not explain ER	3.47	0.004**	ST→EX
	ER does not explain ST	46.297	<2.2e-16***	EX→ST
Malaysia	ST does not explain ER	0.878	0.4951	
	ER does not explain ST	56.72	<2.2e-16***	EX→ST
Korea	ST does not explain ER	1.6531	0.1433	
	ER does not explain ST	106.95	<2.2e-16***	EX→ST
Indonesia	ST does not explain ER	2.2214	0.05	
	ER does not explain ST	61.911	<2.2e-16***	EX→ST
Panel C: After Financial Crisis				
Country	Null Hypothesis	F-Statistic	Prob.	Conclusion
Vietnam	ST does not explain ER	0.9382	0.4409	
	ER does not explain ST	4.044	0.002924**	EX→ST
Taiwan	ST does not explain ER	0.4689	0.7586	
	ER does not explain ST	15.949	1.092e-12****	EX→ST
Malaysia	ST does not explain ER	0.4672	0.7598	
	ER does not explain ST	52.943	<2.2e-16***	EX→ST
Korea	ST does not explain ER	0.6989	0.5928	
	ER does not explain ST	22.015	<2.2e-16***	EX→ST
Indonesia	ST does not explain ER	0.2108	0.9325	
	ER does not explain ST	37.192	2.2e-16***	EX→ST

Source: From author's analysis by R-project

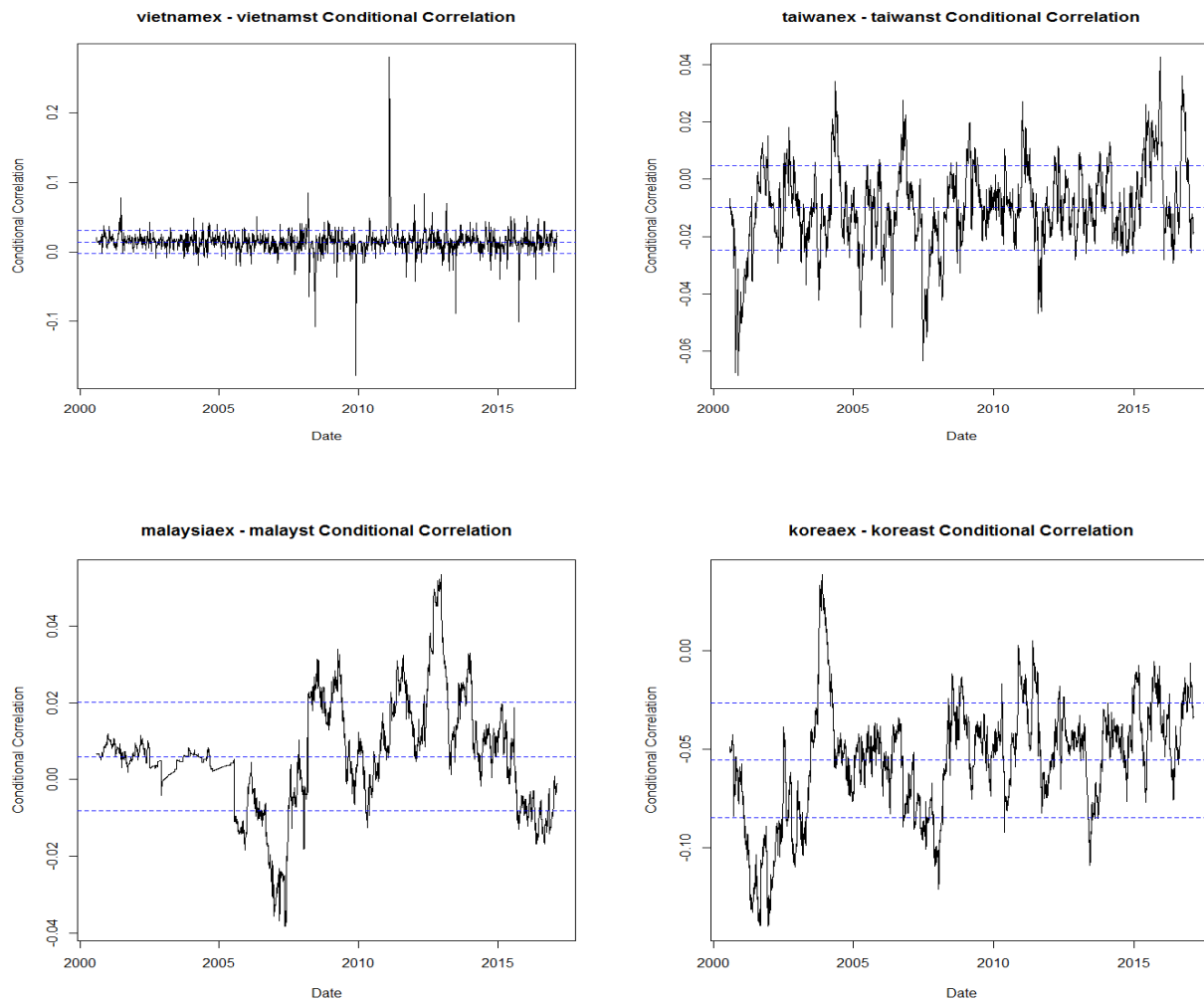
(Note: *, **, *** denote rejections of the null hypothesis at 1%, 5% and 10% significant levels, respectively; ST is Stock equity return and ER is Exchange rate return).

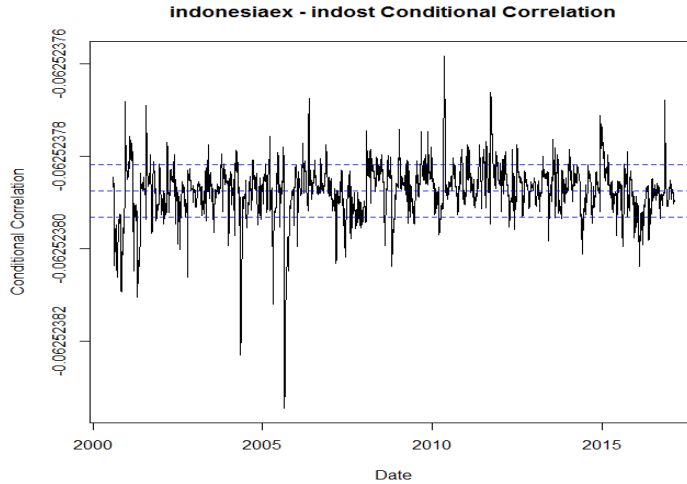
The most important of Granger test is that this test is a statistical hypothesis test for determining whether one time series is useful in forecasting another one. From table 4, most of countries show that exchange rate significantly lead stock prices. Before the crisis, the exchange rate explains to stock market in most of countries, except Vietnam, similar to during the crisis and the significant exists in all countries after the crisis. Vietnam just shows the significance after the finance crisis. Furthermore, one important sign in this table is the multi-relationship between both stock and exchange rate in Taiwan.

2.4 Dynamic conditional correlation (DCC) model

Figure 1 shows the dynamic conditional correlation result for each country

Fig. 1: Dynamic correlation condition of 5 ASIAN countries





Due to the DCC model allows the correlation matrix to be changed over time, so we could observe the change of two variables from 2001 to 2017. In here, we have two groups of trend. One includes Vietnam and Malaysia, those trends are very hard to catch and always peak out the mean. Taiwan, Korea and Indonesia show the similar results. Their line moves around the average value and has the obvious trend. This could be the fix currency policy of the government. Taiwan and Korea are similar with the clearly fluctuation and easy to see. Both Taiwan and Korea use the free floating Currency policy. Before 2005, Malaysia used fix currency policy and after then, they have changed to managed floating.

Conclusion

With the development of technology, the information is very easy to catch up nowadays. Then, investors can have more opportunities with foreign market investment, not only stock or exchange market but also another fiscal channels, special with developing or emerging market, although following with high benefit, the technical risk is high as well. This paper explores the dynamic linkage between two variables as stock equity and exchange rate return of 5 evidences from ASIAN from 2001-2017.

The finding in this paper follows implication. First, the global financial crisis in 2008 made definitely effect to correlation between stock equity and exchange rate market, especially in countries that have long-standing development and strong linkage with world economy such as Malaysia and Korea. Vietnam is an interesting case that shows no significant for the

correlation by the crisis. Secondly, the unidirectional impact was found in most of cases and multidirectional effect is showed in Taiwan. Finally, the way of each countries response to the crisis will be depended on both objective and subjective factors. They may come from the difference between geographic, fiscal institution, scale of economy or experience...

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References

- Alhayky, A., & Houdou, N. (2009). Stock Prices and Exchange Rates: Empirical Evidence from Kuwait's Financial Markets. *IUP Journal of Financial Economics*, 7(3/4), 71.
- Caporale, G. M., Hunter, J., & Ali, F. M. (2014). On the linkages between stock prices and exchange rates: Evidence from the banking crisis of 2007–2010. *International Review of Financial Analysis*, 33, 87-103.
- Caporale, G. M., Pittis, N., & Spagnolo, N. (2002). Testing for causality- in- variance: an application to the East Asian markets. *International Journal of Finance & Economics*, 7(3), 235-245.
- Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American statistical association*, 74(366a), 427-431.
- Engle, R. (2002). Dynamic conditional correlation: A simple class of multivariate generalized autoregressive conditional heteroskedasticity models. *Journal of Business & Economic Statistics*, 20(3), 339-350.
- Granger, C. W. (1988). Causality, cointegration, and control. *Journal of Economic Dynamics and Control*, 12(2-3), 551-559.
- Hatemi-J, A., & Roca*, E. (2005). Exchange rates and stock prices interaction during good and bad times: evidence from the ASEAN4 countries. *Applied Financial Economics*, 15(8), 539-546.
- Jarque, C. M., & Bera, A. K. (1980). Efficient tests for normality, homoscedasticity and serial independence of regression residuals. *Economics letters*, 6(3), 255-259.

Johansen, S. (1991). The power function of the likelihood ratio test for cointegration. In *Econometric decision models* (pp. 323-335). Springer, Berlin, Heidelberg.

Kwiatkowski, D., Phillips, P. C., Schmidt, P., & Shin, Y. (1992). Testing the null hypothesis of stationarity against the alternative of a unit root: How sure are we that economic time series have a unit root?. *Journal of econometrics*, 54(1-3), 159-178.

Ozair, A. (2006). Causality between stock prices and exchange rates: A case of the United States. Florida Atlantic University, Master of Science Thesis.

Pan, M. S., Fok, R. C. W., & Liu, Y. A. (2007). Dynamic linkages between exchange rates and stock prices: Evidence from East Asian markets. *International Review of Economics & Finance*, 16(4), 503-520.

Solnik, B. (1984). Stock prices and monetary variables: The international evidence. *Financial Analysts Journal*, 40(2), 69-73.

Zhao, H. (2010). Dynamic relationship between exchange rate and stock price: Evidence from China. *Research in International Business and Finance*, 24(2), 103-112.

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