STOCK MARKET INTEGRATION BETWEEN MALAYSIA AND INDONESIA

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Abstract - This research is done to prove the integration market between Indonesian and Malaysian composite index. In this research, it used the GARCH model because of the classic assumption test of non heteroscedasticity model are not fulfilled. The research is quantitative research. It used the data from yahoo finance starting on January 2008 until December 2012. The samples used in this research are 1220 data from each Indonesian and Malaysian return price in daily basis. The data was processed into several test and hypothesis. The research results indicates that Malaysian composite index have a significant impact on Indonesian composite index in the same day. The data will be useful for investor to predict the return of Indonesian composite index.

Keywords: *stock market integration, Indonesian and Malaysian composite index, GARCH model*

INTRODUCTION

In this globalization era, many countries can accelerate and increase its economic growth. There are a lot of impacts because of globalization, one of the impact is opening market and large of investment opportunity for financial transaction worldwide. Basically investment is a monetary asset purchased with the idea that the asset will provide capita gain in the future and can be sold in higher value than before. Capital market is a market for a long-term financial instrument, which is tradable. It can be traded in two ways, obligation or stock, published by government, public authorities, and private companies. Investors should concern about two things while investing their money, the risk and also the return. Risk and return are crucial to determine investors' decisions.

There are two economic indicators that will be used in this research which are Kuala Lumpur Composite Index (KLCI) and Indeks Harga Saham Gabungan (IHSG). This research will conducted in 5 years period during January 2008 until December 2012 using the return of both composite indexes. The research will

tested using Generalized Auto Regression Conditional Heteroskedasticity Model (GARCH), if two or more stocks have the same movements, it indicates the integration between the stock markets, and one of the integrated stock market can be used to predict the return of the other stock markets (Amir Nasry, 2006).

This research uses two countries, Indonesia and Malaysia, because Indonesia and Malaysia are geographically close. This research will test about stock market integration between the return of composite index in Malaysia with and the return of composite index in Indonesia. The purpose of this research is to understand the effect of Indonesia and Malaysia index, and also to see whether or not there are any influence between the Indonesian index and Malaysian index. This research will give information for some parties, such as the academics to conduct future research to determine the integration between other countries and for the investors to predict the return of Indonesia by using the return in Malaysia.

RESEARCH METHOD

This research is quantitative research. This research used numerical data and statistics for test. The type of quantitative research that used in this research is causal research, to find and describe the relationship and the influence from the variables of this research to be concluded. A total data of this research are 1220 data from each composite indexes from the return during 5 years period (daily data).

The data will test using several tests, which are chow test, stationerity test, normality test, heteroskedasticity test, and Generalized Autoregressive Conditional Heteroskedasticity test (GARCH).

RESULTS AND ANALYSIS

The following is IHSG and KLCI data during research period on January 2008 until December 2012.

Table 1.1
Descriptive Data

Sample: 11220		
	IHSGT	**KLCIT**
Mean	0.000506	0.000156
Median	0.001166	0.000172
Maximum	0.079215	0.219700
Minimum	-0.103753	-0.175076
Std. Dev.	0.016158	0.013216
Sum	0.617738	0.190214
Sum Sq. Dev.	0.318255	0.212901
Observation	**1220**	**1220**

Source: Data processed

According to table 1.1, the information that obtained for Indonesia capital market (IHSG), the minimum return value for period 2008 until 2012 is -0.103753 and the maximum value is 0.079215. IHSG index return mean for period 2008 until 2012 is 0.000506 and standard deviation is 0.016158. This result shows that fluctuation movement of IHSG index return within those periods is quiet high. Meanwhile, for Malaysia capital market (KLCI), the minimum indexes return value is -0.175076 and the maximum value is 0.219700. KLCI index return mean is 0.000156 and standard deviation is 0.013216. In comparison shows that the index return on capital market in Indonesia is slightly higher than index return on capital market in Malaysia and also the fluctuation level in Indonesia is very high.

Particularly, the movements IHSG index return fluctuated high. Analysis using data that has high fluctuation can lead to the loss of information which can be very important for the investors' interest. Therefore, before analyze the data which has high fluctuation, the data should be tested to determine the existence of breakpoint. If there is no breakpoint, the analysis data of certain period can be continued. However, if the data pattern has breakpoint, then the analysis should be done separately so that the information can be generated better.

The determination of before and after test period were done by using *Chow Break Point* with criteria. If the test result has significance value less than 5% (error rate), then there will be structure change for the data. If the significance value is greater than 5%, then structure of the data used does not indicate significant change.

Table 1.2
Chow Breakpoint Test Period August 11th, 2008 to October 29th, 2008

Model	Test Period	F Statistic	Sig.
$IHSG_{t-i} \rightarrow IHSG_t$	11/08/2008 – 29/10/2008	6,470	0,000
$KLCI_{t-i} \rightarrow IHSG_t$	11/08/2008 – 29/10/2008	9,726	0,000

Source: Data processed

Chow Break Point test result for period August to October 2008 on 2 capital market index return against Indonesia capital market (IHSG) generate significant F value which all of value are less than 5% (error rate). In conclusion, the existence of breakpoint on October 7th, 2008 to Indonesia capital market (IHSG) cause changes in capital market index return in certain period. According to the test result, cut off before and after test period is on October 7th, 2008.

After test the breakpoint, the research should dived into two periods, before the breakpoint and after the breakpoint. And each of period should be tested with heteroskedasticity test before doing another test.

Table 1.3
White Heteroskedasticity Test Before Breakpoint

Relationship Model	**Scale Explained SS**	**Sig.**
$IHSG_{t-i} \rightarrow IHSG_t$	239,569	0,000
$KLCI_{t-i} \rightarrow IHSG_t$	47,132	0,000

Source: Data processed

Non heteroskedasticity linear regression model test result about the effect of IHSG index return on period t-i against IHSG index return on period t and regression model about the effect of KLCI index return on period t-i against IHSG index return on period t before breakpoint shows significance value for all Scale

Explained SS which are less than 5%. Thus, non heteroskedasticity regression model assumption has not been fulfilled.

Table 1.4
White Heteroskedasticity Test After Breakpoint

Relationship Model	Scale Explained SS	Sig.
$IHSG_{t-i} \rightarrow IHSG_t$	536,912	0,000
$KLCI_{t-i} \rightarrow IHSG_t$	861,137	0,000

Source: Data processed

Non heteroskedasticity linear regression model test result about the effect of IHSG index return on period t-i against IHSG index return on period t and regression model about the effect of KLCI index return on period t-i against IHSG index return on period t after breakpoint shows significance value for all Scale Explained SS which are less than 5%. Thus, non heteroskedasticity regression model assumption has not been fulfilled.

Because of the non heteroskedasticity are not fulfilled, this research will use GARCH model in both period. The following is the result of GARCH model estimation on period after breakpoint:

Table 1.5
GARCH Model Estimation Result

Relationship Model	GARCH Functions
$IHSG_{t-i} \rightarrow IHSG_t$	$R_{IHSGt} = -0{,}0019 + 0{,}139IHSG_{t-1} - 0{,}048IHSG_{t-2} + 0{,}015IHSG_{t-3}$ $\sigma^2_t = 6{,}59x10^{-6} + 0{,}075\ e^2_{t-1} + 1{,}612\ \sigma^2_{t-1} - 0{,}684\ \sigma^2_{t-2}$
$KLCI_{t-i} \rightarrow IHSG_t$	$R_{IHSGt} = -0{,}001 + 0{,}733KLCI_t + 0{,}030KLCI_{t-1} - 0{,}007KLCI_{t-2} - 0{,}013\ KLCI_{t-3}$ $\sigma^2_t = 9{,}23x10^{-5} + 0{,}121\ e^2_{t-1} + 0{,}041\ e^2_{t-2} - 0{,}166\ e^2_{t-3} + 0{,}728\ \sigma^2_{t-1}$

Source: Data processed

Table 1.5 shows the GARCH model estimation result that has been done using Eviews software. The result is from the following table.

Table 1.6
t Test $KLCI_{t-i}$ Against $IHSG_t$

Variabel	z	Sig
C	-0,001	
$KLCI_t$	0,733	0,000
$KLCI_{t-1}$	0,030	0,788
$KLCI_{t-2}$	-0,071	0,607
$KLCI_{t-3}$	-0,013	0,889
C	$9{,}23 \times 10^{-6}$	
ARCH (1)	0,121	0,203
ARCH (2)	0,041	0,698
ARCH (3)	-0,166	0,005
GARCH (1)	0,728	0,000

Source: Data processed

z test result shows KLCI index return on period t has significant influence against the movement of IHSG index return on the same period, while KLCI index return t-1 until t-3 against IHSG index return on period t does not has significant influence. The influence has positive result, means that if KLCI index return has increase, IHSG index return will also increase.

Table 1.7
GARCH Model Estimation Result Before Breakpoint

Relationship Model	GARCH Functions
$IHSG_{t-i} \rightarrow IHSG_t$	$R_{IHSGt} = 0{,}001 + 0{,}027IHSG_{t-1} - 0{,}022IHSG_{t-2} - 0{,}089IHSG_{t-3}$ $\sigma^2_t = 3{,}71x10^{-6} + 0{,}065\ e^2_{t-1} + 0{,}071\ e^2_{t-2} + 0{,}849\ \sigma^2_{t-1}$
$KLCI_{t-i} \rightarrow IHSG_t$	$R_{IHSGt} = 0{,}001 + 0{,}316KLCI_t - 0{,}0004KLCI_{t-1} + 0{,}038KLCI_{t-2} - 0{,}067\ KLCI_{t-3}$ $\sigma^2_t = 5{,}41x10^{-6} + 0{,}169\ e^2_{t-1} + 0{,}455\ \sigma^2_{t-1} + 0{,}352\ \sigma^2_{t-2}$

Source: Data processed

Table 1.7 shows the GARCH model estimation result that has been done using Eviews software. The result is from the following table.

Table 1.8
t Test $KLCI_{t-i}$ Against $IHSG_t$

Variabel	z	Sig.
C	0,001	
$KLCI_t$	0,316	0,000
$KLCI_{t-1}$	-0,0004	0,988
$KLCI_{t-2}$	0,038	0,325
$KLCI_{t-3}$	-0,067	0,160
C	$5{,}41 \times 10^{-6}$	
ARCH (1)	0,169	0,000
GARCH (1)	0,455	0,017
GARCH (2)	0,352	0,041
C	0,001	

Source: Data processed

z test result shows KLCI index return on period t has significant influence against the movement of IHSG index return on the same period, while KLCI index return t-1 until t-3 against IHSG index return on period t does not has

significant influence. The influence has positive result, means that if KLCI index return has increase, IHSG index return will also increase.

IV. CONCLUSION AND RECOMMENDATION

Based on several tests which have been conducted to prove the working hypothesis that has been made in chapter 2, it can be concluded that the two independent variables ($IHSG_{t-i}$ and $KLCI_{t-i}$) has significant influence on certain period against $IHSG_t$. Because of the impact of US crisis on 2008, the research should divide into 2 periods using the Chow breakpoint test.

The first period is before the impact of the US crisis. In this period, the research shows that $KLCI_{t-1}$, $KLCI_{t-2}$, $KLCI_{t-3}$ also do not have a significant effect for $IHSG_t$, but $KLCI_t$ has a significant effect for $IHSG_t$, the effect is positive means if KLCI return is increase, IHSG return will also increase.

The second period is after the impact of the US crisis. In this period, the research shows that $KLCI_{t-1}$, $KLCI_{t-2}$, $KLCI_{t-3}$ also do not have a significant effect for $IHSG_t$, but $KLCI_t$ has a significant effect for $IHSG_t$, the effect is positive means if KLCI return is increase, IHSG return will also increase.

Based on the research that has been conducted on the relationship between Indonesian and Malaysian indexes, then there are some recommendations that may be useful for some parties associated with this research.

For academics, the future research can use this research to determine the integration between other countries and perhaps the next researcher can give more hypotheses to develop the other result such as “IHSG affect the KLCI significantly”, because in this research only provide the one ways relationship (KLCI affected IHSG movement). And also the next researcher can add another variables such as ASX (Australian Stock Exchange) because Indonesia and Australia is geographically close, even in different continent.

For investors, especially for stock investor are suggested to be more selective before investing in stocks, because there will be many other factors and variables that could affect the stock prices, either directly or indirectly. At this point, investor should be able to see a safer investment by using the prediction

data in 3 days before the execution ($IHSG_{t-3}$) and from $KLCI_t$, so investors can minimize the risk and gain more return.

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