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The Performance of Bursa Malaysia and its Causality Effect with South Korea, Taiwan and Japan Stock Exchanges: 2000 – 2004

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ABSTRACT

This study examines the effect of returns from South Korea, Taiwan and Japan Stock Exchanges on the Bursa Malaysia in the year 2000 to 2004. The return from an individual stock exchange is no longer exclusive but with effect of globalization, it is also influenced by activities happening in other countries. The sources of co-movements between stock markets are of great importance both for international investors and academics. A better knowledge of the underlying factors may improve portfolio management and help to assess the degree of financial integration and efficiency.

These four economies are significantly different in terms of the size of each economy, degree of development, rate of growth, and maturity of financial markets. Regarding the maturity of financial markets, Japan is considered developed markets, while Korea, Malaysia and Taiwan are considered to be emerging markets and do not have a completely open equity market to foreign investors.

The 'granger causality' test will be employed to determine the causality effect between Bursa Malaysia and these stock exchanges. In addition, to measure the performance of each market the 'buy and hold' abnormal returns approach will be applied. Earlier indication does show that there is no causality effect between Bursa Malaysia with Taiwan and Japan Stock Exchanges. The results on the stock markets performance shows that the Bursa Malaysia did significantly outperform all the three markets in this study.

Introduction

The sources of co-movements between stock markets are of great importance both for international investors and academics. A better knowledge of the underlying factors may improve portfolio management and help to assess the degree of financial integration and efficiency.

These four economies are significantly different in terms of the size of each economy, degree of development, rate of growth, and maturity of financial markets. Regarding the maturity of financial markets, Japan is considered developed markets, while Korea, Malaysia and Taiwan are considered to be emerging markets and do not have a completely open equity market to foreign investors.

One of those significant developments occurred in the ASEAN economies is the implementations of deregulation and liberalization of financial markets in this region. Specifically, in the latter half of the 1980s and early years of the 1990s, most of the governments of ASEAN gradually liberalized their stock markets, giving foreign investors the opportunity to invest in domestic securities. The rapid developments of telecommunications networks have greatly facilitated the dissemination of information, hence providing easier access for domestic and international investors to these markets.

In the econometric literature there now exists many alternative estimation methods that permit valid testing of causal inferences among variables which are known to be co-integrated, used in this study is the Granger F-tests.

Problem Statement

This paper empirically investigates the significant relationships between Bursa Malaysia Composite Index and three others world indices which are Tokyo Stock Exchange (Japan), Taiwan Stock Exchange Index (Taiwan) and Korean Stock Exchange Index (South Korea) from year 2000 to 2004. The rationale for choosing the Japan, Korea and Taiwan markets are due to their close relationship with the Malaysian economy and these markets offer opportunities for evaluating the performance of Bursa Malaysia. Specifically, this study attempts to find out whether there is any causality relationship Bursa Malaysia Composite Index and stock indices of the Japan, Korean and Taiwan stock exchanges. In order to examine these effects, the daily data of those stock market returns indexes are examined.

This study is designed to employ Granger Causality Test that closely follows Anoruo, Ramchander and Thiewes (2003), Baharumshah, Sarmidi, and Tan (2003), and Roca (1999) in determining which indexes have greater influence on Bursa Malaysia Composite Index.

On the other part of the study, we analyze the performance of one exchange to another since an adverse performance might cause outflow of portfolio funds

from the low performance markets to the high performance markets. The buy and hold abnormal returns method of by Barber and Lyon (1996 and 1997) will be employed for this study to examine the performance of Bursa Malaysia as compared to those stock markets of Japan, Korea and Taiwan.

The findings of this study will shed some light on the behavior of Bursa Malaysia in respect to the behavior of Japan, Korea and Taiwan Exchanges. The examination of the performance of Bursa Malaysia against those three markets will provide valuable information on the future movements of portfolio funds in this region. Since the movement of portfolio funds does affect the balance of payment of a country, thus the results of this research can be used to as a factor in predicting the economic growth of this country.

Literature Review

The interdependence of regional stock markets has been the subject of extensive research during the last decade, originated from studies concerning international portfolio diversification. The researchers, like Grubel (1968), Levy and Samat (1970), Solnik (1988) used mean-variance analyses of international share price integration. Granger and Mortensten (1970) applied multivariate spectral techniques to the key world stock price indices and found limited evidence of global share price integration, an outcome challenged by Hilliard (1979).

Co-dependence of Asian Stock Markets

The main focus of the empirical research works has been the national stock markets of industrialized countries, which are considered as fundamentally established markets. More recently, the Asian stock markets are getting more attention from researchers, partly as a result of their high rates of economic growth and the 1997 Asian financial crisis. In this context, Masih and Masih (1997, 1999, 2001) have made a significant contribution to the literature, not only addressing the fundamental issue of stock markets interdependencies, but to provide further understanding of the patterns of these linkages and the nature of the propagation mechanism driving the Asian stock market fluctuations.

On the other hand, Baekaert and Harvey (1995) observed that the level of integration between emerging markets (including Malaysia) with developed markets have increased. Studies by Bae, Cha and Cheung (1998) as well as Johnson and Soenen (2002) revealed that the Asian stock markets including Malaysia have strongly integrated with the Japanese markets. Bilson et al. (2001) found that the regional integration among stock markets in Malaysia, the Philippines, South Korea, Taiwan and Thailand is faster than their integration with the other global markets.

Gong, et al (2004) studied the nature of the dynamic relationship among stock markets within the same geographical area – namely the performance of seven stock markets in the Asian region namely Malaysia, Hong Kong, Indonesia, Japan, the Philippines, Singapore and Thailand, from January 1990 to December 1998.

Evidence from analysis by Toda and Yamamoto (1995) found that the U.S played the leading role. At the global level, while Hong Kong is the leader in the Southeast Asian region. Masih and Masih (2001) found in their investigation that the dynamics causal linkages amongst nine major international stock indices and interestingly found that the growing role of the Japanese market as a long run leader in influencing the propagation mechanism driving international stock market linkages, including the emerging Asian stock markets.

Granger Causality Test

The Granger causality test is a simple way to ascertain whether a particular market is affected by innovations in other markets. The test indicates that innovations in one market can help forecast a one-step-ahead return in another market.

A series is said to "Granger-cause" another series if past values of the first are useful in predicting the second, i.e. the former precedes the latter inter-temporally (Heckelman, 2000). If one variable does not cause the other in this temporal sense, then lagged values of that variable should not improve the predictive power of the other variable beyond simply including its own lags.

Data and Research Methodology

The data set is developed from a daily time series of the following share prices indices: Bursa Malaysia, the Korea Composite, Japan's Nikkei and Taiwan Weight index. The daily closing value of each index for the period January 2, 2000 to December 31, 2004, is extracted from Datastream. The four index series were denominated in local currencies and were not converted to US dollar. This is to show the impact of local economic conditions and economic policies that causes the share price interdependence at its best.

Data

The main objective of this study is to examine the performance of Bursa Malaysia (BM). This study also compares the performance of BM with closing share prices indices: the Korea Composite (KC), Japan's Nikkei (JN) and Taiwan Weight (TW) index. The daily return index data will be gathered for all stock exchanges

for the period of January 2000 to December 2004. The data will be collected from Datastream.

The study on the performance of the BM is to determine the effect of the BM on the other exchanges during 5 years (January 2000 to December 2004). A question arises as to whether the performance of BM is significantly different from other Stock Exchanges (South Korea, Japan and Taiwan) or whether the performance of BM is not influenced by them, collectively or individually.

Testing Methodologies

Unit Root Tests

The unit root tests serve as preliminary step to determine the order of integration for each of these stock price indices. We employed the Phillips-Perron unit root tests to check for stationary of the stock market indices series of the four countries. To test for stationary of the series, we use the Phillips-Perron (PP) test. This test is to consider the following model:

$$Y_t = \alpha + Y_{t-1} + \mu_t$$

where,

Y_t = present value of a variable
Y_{t-1} = immediate past values of a variable
μ_t = stationary error term.

If the absolute value of the computed t-statistic for f_i exceeds the absolute critical value given in Mc Kinnon (1990), then the null hypothesis of the X series is not stationary must be rejected against its alternative. A rejection of the unit root hypothesis implies that the variables are stationary.

If on the other hand, it is less than the critical value, it can be concluded that the level of X is non-stationary. In this case, the same regression must be repeated for the first difference of the logarithmic value of the series.

Johansen Bivariate Co-integration Analysis

The next step is to examine if two variables are co-integrated. This study will employ the Johansen test to examine if any two stock markets are co-integrated, and then one could be used to predict the other.

Selection of the model form depends on the likelihood ratio (LR) test statistics, which denote LR, based on eigenvalue. If the LR value is larger than the critical value, the null hypothesis of no co-integration is rejected. If on the other hand, it is less than the critical value, we fail to reject the null hypothesis between the variables.

Co-integration Equation:

$$\text{Log } Y_t = \alpha + \beta \log X_t + RES_t$$

Null Hypothesis: No co-integration

The rejection of Null Hypothesis concluded that the stock market is co-integrated and has a long run co-integrating relationship.

Measuring Abnormal Returns

Brown and Warner (1980) illustrated the models for generating ex ante expected returns. They are the most frequently applied models in event studies. The models are as follows:

1. Mean Adjusted Returns

The Mean Adjusted Returns model assumes that the ex ante expected return for a given security i is equal to a constant Ki which is not necessarily the same for all securities:

$E(R_i) = K_i$. This situation would hold if interest rates, risk premia, and the expected returns of securities remain constant over time.

2   Market and Risk Adjusted Returns

This model presumes that some version of the Capital Asset Pricing Model determine expected returns. For example, in Black (1972):

$$E(R_{it}) = E(R_{zt}) + b \ [E(R_{mt}) - E(R_{zt})] = K_{it}$$

for any security i, where Rzt is the return on a minimum variance portfolio of risky assets which is uncorrelated with the market portfolio. In the Capital Asset Pricing. Model benchmark, the Rzt is the return on a risk-free security. The abnormal return å it is equal to $R_{it} - [R_{zt} + \beta_i (R_{mt} - R_{zt})]$. To implement this model β_i must first be estimated. Model 2 collapses to Model 1 if a security's systematic risk is constant over time.

3. Market Adjusted Returns

This model assumes that the ex ante expected returns are equal across securities but not necessarily constant for a given security. The assumption that the market portfolio of risky assets is a linear combination of all securities results in

$$E(R_{it}) = E(R_{mt}) = K_t$$

for any security i. The ex post abnormal return on any security i is determined by subtracting the market portfolio return from that security's return: $\varepsilon_{it} = R_{it} - R_{mt}$. This model will collapse to model 2 and is consistent with the Capital Asset Pricing Model if all securities have systematic risk equal to 1.

4. Matched/Control Portfolio Benchmark Model

The matched or control portfolio benchmark model, also known as the "difference in returns" benchmark, is the least widely used model in standard event studies.

The abnormal return is calculated by subtracting the return on portfolio q from portfolio p: $\varepsilon_{it} = R_{pt} - R_{qt}$. Another version of this model (for example, Vermaelen, 1981) determines abnormal returns for individual securities as the difference between actual security returns and the return on a reference portfolio of securities in the same beta risk group.

Typically, for security i and monthly period T the abnormal return is:

$$AR_{iT} = R_{iT} - R_{mT}$$

For a sample of n securities, the average abnormal returns for period T are determined as follows:

$$\overline{AR_T} = \frac{1}{n} \sum_{i-1}^{n} AR_i T$$

One of the methods of accumulating abnormal returns over time is the Cumulative Abnormal Returns technique as employed by Fama, Fisher, Jensen and Roll (1969).

The Cumulative Abnormal Returns for a given event-related period T is defined as the value of the Cumulative Abnormal Returns in previous event periods plus the current value of the average abnormal returns:

$$CAR_T = CAR_{T-1} + \overline{AR_T}$$

or

$$CAR_T = \sum_{t=1}^{T} \overline{AR_t}$$

where;

$\overline{AR_t}$ = the average abnormal return at time t

Calculating the average abnormal return and its standard errors across securities to give a t-statistic as follows can test the significance of the abnormal returns:

$$t_{AR} = \frac{\overline{AR_t}}{\sqrt{\frac{1}{n \cdot 1} \sum_{t=1}^{n} (AR_{it} - AR_t)^2}}$$

The significance of the cumulative abnormal return is determined as follows

$$t_{CAR} = \frac{\overline{AR_t}}{\sqrt{\frac{1}{n \cdot 1} \sum_{t=1}^{n} (AR_{it} - AR_t)^2}}$$

where, CARt is the cumulative abnormal return at time t

5. Buy-and-Hold Abnormal Returns

Barber and Lyon (1997) defined the buy-and-hold abnormal return of a sample firm as the difference between the buy-and-hold return of the sample firm less the equally weighted buy-and-hold return of the matched firms in the benchmark portfolio.

$$BHAR_{ksT} = \left[\prod_{t=s}^{s+\tau} (1 + R_{kt}) \right] - \frac{1}{n_t} \sum_{i=1}^{n_t} \left[\prod_{t=s}^{s+\tau} (1 + R_{i_q t}) \right]$$

where,

$BHAR_{ksT}$ = the buy-and-hold abnormal return of security k from period s to period s + τ, s is the beginning period.

R_{kt} = the rate of return of security k at time t

R_{iqt} = the rate of return of security i in matched benchmark q at time t

This methodology does not automatically suggest a particular composition for the benchmark portfolio. On the other hand, the application of the skewness-adjusted t-statistic to test the significance of the buy-and-hold abnormal returns of the sample firms is the most appropriate. Besides its ability to test the significance of the observed abnormal returns, the skewness-adjusted t-statistic is also convenient to apply.

The skewness-adjusted t-statistics is defined as:

$$t_{sa} = \sqrt{n}\left[s + \frac{1}{3}\breve{\gamma} s^2 + \frac{1}{6n}\breve{\gamma} \right]$$

$$s = \frac{\overline{AR_t}}{\sigma(AR_t)}$$

$$\breve{\gamma} = \frac{\sum_{i=1}^{n}(AR_{it} - \overline{AR_t})^3}{n\sigma(\overline{AR_t})^3}$$

where;

t_{sa} = the skewness-adjusted t-statistic

$\breve{\gamma}$ = the estimate of the coefficient of skewness

Findings and Analysis

Unit Root Tests

To test the order of integration for each of the five ASEAN stock price indices, we use the non-parametric PP ρ-test (Phillips and Perron, 1988) and Dickey-Fuller, Augmented Dickey-Fuller (ADF) (Said & Dickey, 1984). The unit root test statistics revealed that each series is non-stationary in log levels but stationary in log first differences. Table 1 summarizes the Phillip Peron tests for Unit Root in the four stocks market. The table shows that all stock markets in their level form are I(1) while the first difference was I(0). It means that the stock price become stationary after differencing once.

Table 1: Phillip Perron Unit Root Test Result

Variables		Levels	1st Difference	
Malaysia	-2.5560	(-3.4165)	-28.6426	(-3.4165)
Japan	-2.1705	(-3.4165)	-30.9673	(-3.4165)
Korea	-3.2283	(-3.4165)	-31.8084	(-3.4165)
Taiwan	-3.2148	(-3.4165)	-30.6729	(-3.4165)

From the table, the numbers in bracket shows the 5 % critical value due to Mc Kinnon (1990). The second and third columns summarize the Phillip-Perron test statistics of the variables questioned in their own levels.

The statistics show that all variables in the analysis are stationary in the first difference. It also shows that all series displays a unit root in their level form. While the first differences of the series are taken, the Phillip-Perron test statistics become significant. Therefore, the series are I(1) processes and they are integrated of the same order.

Johansen Co-integration Test

Table 2 shows the result of Johansen Co-integration Test for the KLCI and the other stock markets (i.e. Taiwan Stock Market, Japan DS Stock market and Korea SE Stock Market (KOSPI)).

Table 2: Co-integration of Asian Stock Price with Malaysia

Variables		Likelihood Ratio	Eigenvalue	5 % Critical value
Japan	None	10.2466	0.0076	15.41
	At most 1	2.3113	0.0022	3.76
Taiwan	None	11.8036	0.0015	15.41
	At most 1	1.5185	0.0169	3.76
Korea	None	19.2925	0.0169	15.41
	At most 1	1.5276	0.0015	3.76

In Johansen Co-integration test, the co-integration relation between KLCI and the other variables are determined separately. The results of the likelihood ratio (LR) test on the Korea Stock Market and Malaysia Stock Market indicate that the null hypothesis of no co-integration is rejected. It shows that only Malaysia and Korea stock markets are co-integrated. It means that both markets have long run relationship.

Meanwhile, the test on Malaysia Stock Market to Japan Stock Market and Taiwan Stock Market failed to reject the null hypothesis of no co-integration. It means that both markets have a short run relationship to KLCI.

Granger Causality Effect

Table 3: Pairwise Granger Causality Test

Null Hypothesis	Lags	Obs	F Stat	Prob.
LJAP does not Granger Cause LMAL	2	1043	0.3662	0.6935
LMAL does not Granger Cause LJAP			1.5045	0.2226
LKOR does not Granger Cause LMAL	2	1043	9.8726	5.7E-05
LMAL does not Granger Cause LKOR			0.3723	0.6893
LTAI does not Granger Cause LMAL	2	1043	2.4720	0.0849
LMAL does not Granger Cause LTAI			3.3883	0.0341

From table 3, we observe that Malaysia Stock Market does not have any influence on the three Stock markets. But the test suggests that we reject the null hypothesis of LKOR does not Granger Cause LMAL, meaning that Korea Stock Market has influence to the Malaysia Stock Market.

From the test, we can conclude that Taiwan stock Market and Japan Stock market do not have any influence on Malaysia Stock Market. So, the changes in both markets would not change the Malaysia Stock market.

Performance of Bursa Malaysia

Performance of Bursa Malaysia from 2000 to 2004 is rather impressive. However this good performance is meaningless without appropriate benchmarks as comparison. Therefore, the Japan, Korean and Taiwan Stock Exchanges performance were used collectively as a benchmark in order to measure the performance of Bursa Malaysia for the year 2000 to 2004. The objective is to determine whether these three markets collectively manage to outperform the performance of Bursa Malaysia during the period under observation. The hypothesis being tested was on whether Average Buy and Hold Abnormal Returns of each of the three markets is equal to zero or not equal to zero.

H_o :   BHAR = 0
H_A :   BHAR $\neq$ 0

Table 4: Performance of Japan, Korea and Taiwan Stock Exchanges

Against Bursa Malaysia 2000 – 2004

MONTHS	BHAR			AVERAGE	T sa	
	JAPAN	KOREA	TAIWAN	BHAR		
1	-0.1525	0.2044	-0.3128	-0.0870	-0.5321	
3	0.2783	0.2294	0.2990	0.2689	4.9715	*
5	-0.4217	-0.2508	-0.3913	-0.3546	-3.7596	*
8	0.1296	0.0819	0.0399	0.0838	3.3242	*
12	-0.0208	0.1247	-0.0543	0.0165	0.3383	
17	-0.0548	-0.0443	-0.0827	-0.0606	-6.7541	*
18	0.0552	0.2970	-0.0058	0.1155	1.3772	
23	-0.1135	-0.1543	-0.1374	-0.1351	-8.6142	*
24	-0.0017	0.0274	-0.0227	0.0010	0.0798	
28	0.3107	0.1869	0.1472	0.2149	5.4673	*
30	-0.0971	0.0057	-0.1163	-0.0692	-1.5708	
31	-0.2459	-0.2336	-0.3135	-0.2643	-18.3097	*
32	-0.3511	-0.2683	-0.2852	-0.3015	-20.7733	*
33	-0.0607	-0.0846	-0.1028	-0.0827	-5.9627	*
36	-0.1877	0.1482	0.2343	0.0649	0.4578	
40	-0.0461	-0.0742	-0.0344	-0.0516	-5.2976	*
43	-0.1310	-0.0993	-0.0965	-0.1089	-16.8429	*
48	-0.0151	-0.0121	-0.0137	-0.0136	-14.6890	*
56	0.0483	0.0634	0.0564	0.0560	11.3538	*
58	-0.0676	-0.0506	-0.0234	-0.0472	-3.2610	*
60	0.0152	0.0327	-0.0141	0.0112	0.7862	

* significant at alpha equal to 5 percent

Table 4 above shows the BHAR of Japan, Korean and Taiwan stock exchanges collectively against the performance of Bursa Malaysia. The result of this study reveals that Bursa Malaysia performance is quite better than the performance of those three markets. Bursa Malaysia returns during the period under examination is significantly better at the 5 percent confidence level. However, during some short-term periods the results are not that conclusive. The finding of this study had provided new empirical evidence on the performance of these stock exchanges from year 2000 to 2004.

Conclusions

In this study, we examine the dynamic co-integrations among the four East Asian stock markets, including Taiwan, Japan, Korea, and Malaysia. While the literature suggests the existence of significant interactions between the four

markets, several tests were conducted to prove such a claim. The tests results from the Granger Test showed that Bursa Malaysia did not affect Korea Stock Exchange. However, as expected, Bursa Malaysia does not affect the other stock markets, namely Japan Stock Exchange and Taiwan Stock Exchange.

The findings agreed with the findings by Roca and Selvanathan (2001) that there is dependence among the Asian stock exchanges. In addition, the study also agreed with Meric and Meric (1989), who stated that the choice of sample period may affect the stock market relationship being not stable. This is because the sample period in this study is post-1997-crisis. There could be some explanation on the dependence of Korea Stock Exchange with Bursa Malaysia.

One possible explanation for this intra-Asian stock markets integration is their strong economic ties, especially their trade and investment that has indirectly linked their stock indices. Phylaktis and Ravazzolo (2002) pointed out that economic integration between countries might provide a channel for linking stock markets even in the presence of foreign exchange controls. Potentially, future research is possible to uncover the forces generating these intra-Asian stock market linkages and to understand the driving force behind stock market relationships.

The results of this study also reveals that Bursa Malaysia performed is relatively better than the performance of the other three markets. Bursa Malaysia returns during the period under examination is significantly better at the 5 percent confidence level.

Limitations of this analysis should not be ignored. The study can further study the effects of the other stock exchanges with Bursa Malaysia. Another useful extension of the paper would be to adjust for differences in relative market sizes and its international linkages with other major stock exchanges of the world.

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