Chapter 5

The Relationship between Asian Stock Markets Integration and the Quality of Stock Markets

In this chapter, the analysis to the main question of this study will be provided, the relationship between stock market integration and its quality. In previous chapters, it is concentrated on how to measure the degree and the likelihood of stock market integration. Time-varying degree and likelihood of stock market integration are estimated using econometrics techniques. Another important component in studying the relationship between stock market integration and market quality is that the market microstructure issues. The quality of market can be viewed as some important parameters of market microstructure determining the quality of the market. As mentioned in section 1.2. and 2.4., the market liquidity and market volatility are chosen as two representatives of stock market quality.

5.1. Market liquidity and market volatility

In studying the market liquidity and market volatility, the variables used for market liquidity and market volatility are important. Practically, the market liquidity is widely known as the trading activity, which could be viewed in different ways. In this study, the trading value turnover, which is the ratio of trading value and the overall market capitalization, is applied as stock market liquidity. Mendelson (1982, 1985), Amihud and Mendelson (1986) defined the trading volume as the summation of number of shares traded. The trading value in this study is U.S. dollar denominated.

Table 5.1.

The Stock Market Liquidity

The liquidity of stock market is calculated by dividing each market trading value by its market. The average time-series for market liquidity of each stock market are reported in the table with its descriptive statistics. U.S. stock market and world capital market statistics are included for references. The data covers the period between May 1991 – December 1999.

	Hong Kong	*Korea*	*Malaysia*	*Philippines*	*Singapore*	*Taiwan*	*Thailand*	*US*	*World*
AVG	0.0385	0.0816	0.0203	0.0167	0.0195	0.1314	0.0398	0.0735	0.0579
STD	0.0170	0.0621	0.0095	0.0115	0.0099	0.0799	0.0240	0.0208	0.0182
Min	0.0159	0.0162	0.0063	0.0029	0.0071	0.0139	0.0109	0.0410	0.0296
Max	0.1260	0.3080	0.0478	0.0776	0.0583	0.3774	0.1234	0.1292	0.1154

The market volatility is calculated using the variance of market excess return. The market excess return is calculated by the equation 20. This measure of stock market volatility is consistent with the study by Markowitz (1959).

The descriptive statistics for market liquidity is reported in table 5.1. In table 5.1., the U.S. market and world capital market is included as references. From table 5.1., it can be observed that Taiwan stock market shows the very high monthly turnover comparatively to the other markets. Malaysia, Philippines, and Singapore do not have so high turnover ratio. However, it seems that the market with high turnover ratio will also have high fluctuation in liquidity.

When looking at the relative market size, which is calculated as the relative market capitalization to the world market capitalization, the finding shows that the Hong Kong stock market and Taiwan stock market is relatively large to the other Asian stock markets. Undoubtedly, the United States stock market is the largest. It is shown for the reference purpose. Singapore, Korea, and Malaysia stock market are roughly the same size. Thailand and Philippines stock markets are quite small when compare with the other Asian stock markets.

Table 5.2.

The Relative Stock Market Size

The size of stock market is calculated by dividing each market capitalization by world market capitalization. The average percentage of time-series of the each relative market size is reported in the table with its descriptive statistics. U.S. stock market and world capital market statistics are included for references. The data covers the period between October 1987 – December 1999.

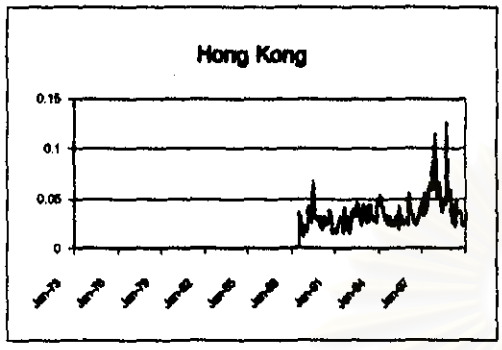
	Hong Kong	*Korea*	*Malaysia*	*Philippines*	*Singapore*	*Taiwan*	*Thailand*	*US*	*World*
AVG	1.4923	0.6820	0.6305	0.1776	0.5938	1.0466	0.2832	34.9381	100
STD	0.5876	0.2290	0.3719	0.1273	0.2559	0.3684	0.2168	6.8428	0
Min	0.6084	0.1575	0.1596	0.0193	0.2834	0.3552	0.0602	24.5240	100
Max	2.8982	1.0742	1.4401	0.4275	1.1244	2.3420	0.7483	49.1979	100

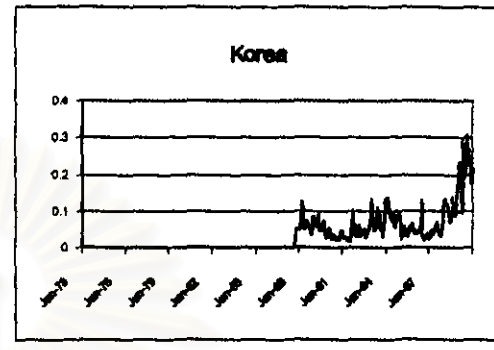
The time-series of the stock market liquidity, stock market volatility, and the size of stock markets are plotted in the figure 5.1., 3.2., and 5.2., respectively.

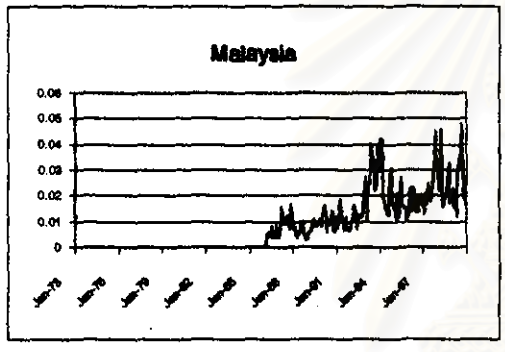
Figure 5.1.

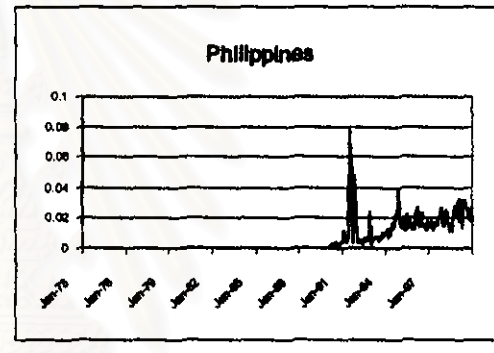
The Stock Market Liquidity

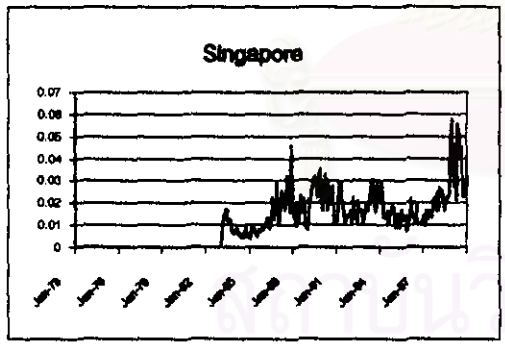
The liquidity of stock market is calculated by dividing each market trading value by its market. The time-series for market liquidity of each stock market are plotted in the figure. U.S. stock market and world capital market statistics are included for references. The data covers the period between May 1991 – December 1999.

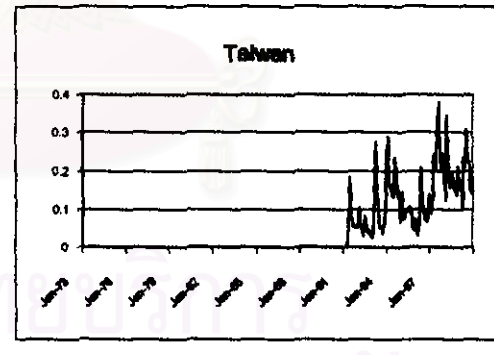


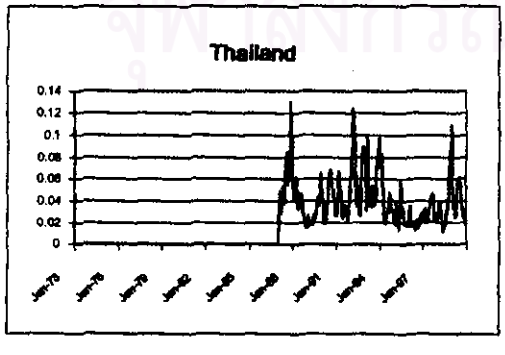


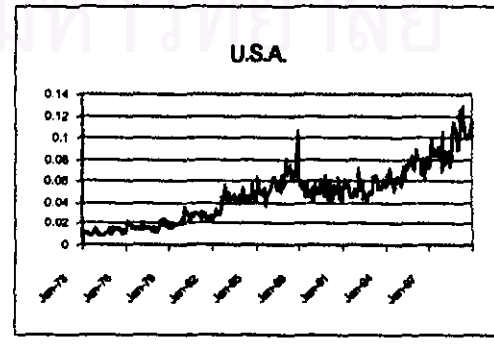












The relationship between market integration and market quality

When the market is in the higher degree of market integration to world capital market, it implies the more ease in the international access to the market. The ease in the access to the market may be due to the relaxation of some hurdle regulations imposed to foreign incoming investment. Putting the other way around, Bhattacharya et. al. (1997) explain in their report that the financial integration will positively associate to the depth and liquidity of the capital market. They also assert that the integration promises to reduce the volatility of the market by allowing a better diversification of portfolios. Moreover, the higher level of financial market integration will also permit the international borrowing and lending to offset the effect of temporary swings in national fortunes. Integration expands the supply of investment resources by inviting the foreign capital flows. Simultaneously, it increases the demand for the domestic securities. The increased demand will drive up the price of the domestic securities, raising the price-earnings ratio and reducing the cost of capital, eventually. Increased foreign activity improves the depth and liquidity of domestic stock markets. A growing share of foreign investment is accounted for by institutional investors could magnify the positive impact on liquidity since institutional investors are very active traders.

Market participants buy and sell the stock according to auction principles. In this market, Domowitz, Glen, and Madhavan (1998) suggest that the greater the number of participants, the deeper the market. Market depth is measured in terms of the ability to accommodate order flow shocks without substantial price movements. This suggestion is consistent with what argued by Bhattacharya et al. (1997). Market integration help increase the number of market participants from both domestic and foreign. This will deepen market as well.

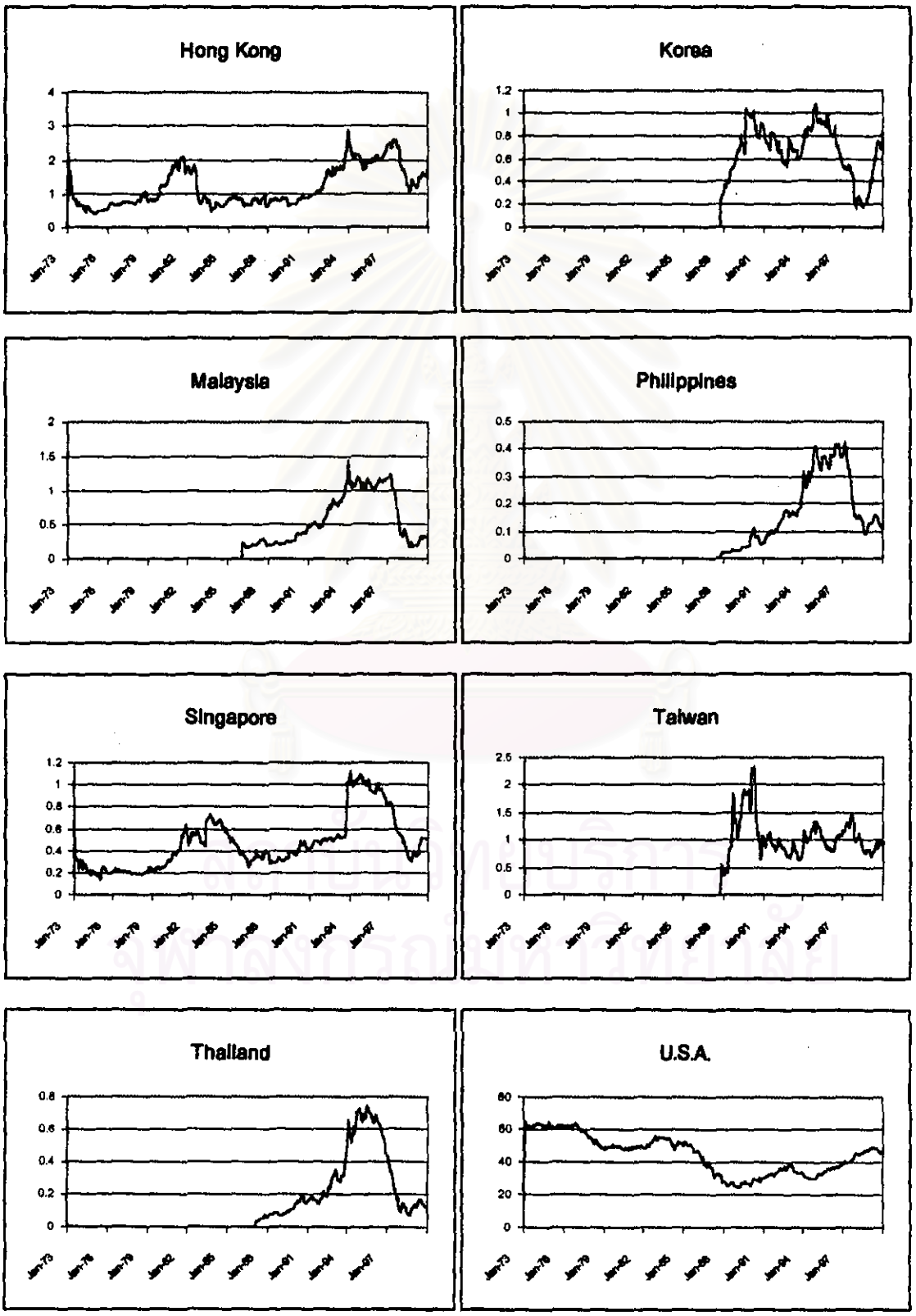
In term of market volatility, integration can be considered as both positive and negative effect for price discovery process in domestic stock markets. On the positive effect, foreign investment increases depth and liquidity in domestic stock markets, thereby reducing volatility. Shallow markets are more prone to volatility since even small trades can affect on price disproportionately. On the negative side, other factors suggest that the integration may lead to an increase in the volatility of domestic stock prices and returns. This is because domestic stock markets are exposed to new external financial shocks according to its openness. The external shocks may be transmitted more quickly across borders. Contagion can be the cases.

By the assertions, the empirical in this issues will be performed. Granger causality is applied to see whether the market integration lead the market quality or *vice versa*. The cointegration test is

Figure 5.2.

The Relative Stock Market Size

The size of stock market is calculated by dividing each market capitalization by world market capitalization. The percentage of time-series of the each relative market size is plotted in the figure. U.S. stock market and world capital market statistics are included for references. The data covers the period between October 1987 – December 1999.



also performed to obtain the conclusion of long-run relationship between market integration and the market quality.

5.2. The models

I analyze the relationship between Asian stock markets integration and the quality of stock markets using Granger causality test and the cointegration test. Instead of using the simple linear regression, both econometrics models are employed because of a number of reasons.

1. To formulate the relationship using the simple linear regression may yield the misspecification of the model. We can not include the essential explanatory variables in the models so that the model will become misspecification.
2. It is hard to say whether the market quality causes the market integration or the market integration causes the market quality. Not only the difficulty but also the less benefit to obtain that knowledge, implication from one Granger causes another should be sufficient to further analysis.
3. The two parameters, market quality and the market integration, are studied to obtain some insight concerning to policy making, eventually. The policy making process concerns the long-run relationship or the equilibrium state of the relationship rather than the ordinary empirical relationship.

The analysis in this chapter will be divided into two main objects, the Granger causality test and the cointegration test.

$$\lambda_t = \Sigma a_i \lambda_{t-i} + \Sigma b_i \alpha_{t-i} \quad (22)$$

$$\alpha_t = \Sigma a_i \lambda_{t-i} + \Sigma b_i \alpha_{t-i} \quad (23)$$

$$\varpi_t = \Sigma a_i \varpi_{t-i} + \Sigma b_i \alpha_{t-i} \quad (24)$$

$$\alpha_t = \Sigma a_i \varpi_{t-i} + \Sigma b_i \alpha_{t-i} \quad (25)$$

$$\lambda_t = \Sigma a_i \lambda_{t-i} + \Sigma b_i \phi_{t-i} \quad (26)$$

$$\phi_t = \Sigma a_i \lambda_{t-i} + \Sigma b_i \phi_{t-i} \quad (27)$$

$$\varpi_t = \Sigma a_i \varpi_{t-i} + \Sigma b_i \phi_{t-i} \quad (28)$$

$$\phi_t = \Sigma a_i \varpi_{t-i} + \Sigma b_i \phi_{t-i} \quad (29)$$

$$\lambda_t = \Sigma a_i \varpi_{t-i} + \Sigma b_i \lambda_{t-i} \quad (30)$$

$$\varpi_t = \Sigma a_i \varpi_{t-i} + \Sigma b_i \lambda_{t-i} \quad (31)$$

where

λ_t is the U.S. dollar denominated trading value turnover for stock market.

ϖ_t is the variance of realized return for market at time j.

α_t is the measure of the degree of Asian stock market integration.

ϕ_t is the likelihood of the Asian stock market integration.

5.3. The Granger causality test

The equation 22 through 31 are used in the analysis of the Granger causality. Granger (1969) defines the analysis that the Granger causality, or precedence, is a circumstance where one time-series variable consistently and predictably changes before another variable does. In this definition, if one variable precedes ("Granger causes") another, it can not be sure that the first variable "causes" the other to change, but it can be fairly sure that the opposite is not the case. In the study of the Granger causality of stock market quality and stock market integration may obtain such conclusion.

Empirical results

The empirical results are shown in table 5.3. The table consists of the statistical estimates results. It consists of five categories of the Granger causality study. They are the relationship between; stock market *liquidity* and the *degree of stock market integration*, stock market *volatility* and the *degree of stock market integration*, stock market *liquidity* and the *likelihood of stock market integration*, stock market *volatility* and the *likelihood of stock market integration*, and stock market *liquidity* and stock market *volatility*.

In Granger causality testing, it is expected to see the "precedence" of the two variables. Thus, each pair of equation, such as equation 22-23, 24-25, etc., are studied. However, the outcome could be one of these cases; *a Granger cause b, b Granger cause a*, or, *both a and b are simultaneously affected by each other.* In the third case, the simultaneous effect, if found, further studied might be the appropriate for the future study. The full table of the Granger causality tests is reported in the Appendix B.

In table B.1., equation 22-23 and equation 26-27 shows the Granger causality of the liquidity and stock market integration. The t-statistics in lower parenthesized cell shows the test result. The summary of the test results is reported in the table 5.3. From the table 5.3., it is quite uneasy to conclude whether market integration leads market liquidity or vice versa. The evidences shown in

the row I-L and L-I for every country is not so strong. It can be observed from table 5.3., the results are mixed. Even when considering that the effects might be the case of simultaneous characteristics, it still can not be concluded because of quite a few of related occurrence.

Table 5.3.

The Summary of Granger causality test of the stock market quality and the level of stock market integration

The granger causality test results are summarized in this table. The full results are reported in Appendix. In the first column, I stands for market integration, L stands for market liquidity, and V stands for market volatility. I-L represents market integration leads market liquidity, L-I represents market liquidity leads market integration, and so on. The table is divided into two parts, the Granger causality and the autoregressive results. Numbers in the cell represents the number of occurrence from all.

	Hong Kong	*Korea*	*Malaysia*	*Philippines*	*Singapore*	*Taiwan*	*Thailand*
				Granger causality			
I - L	1 / 8	2 / 8	0	0	0	0	0
L - I	0	1 / 8	0	0	0	0	1 / 8
I - V	1 / 8	4 / 8	0	0	0	0	0
V - I	1 / 8	1 / 8	4/8	0	0	0	2 / 8
V - L	0	0	0	1 / 4	3 / 4	1 / 4	2 / 4
L - V	2 / 4	1 / 4	0	3 / 4	3 / 4	0	1 / 4
				AR			
I	12 / 16	10 / 16	10 / 16	13 / 16	10 / 16	12 / 16	12 / 16
L	8 / 12	6 / 12	3 / 12	6 / 12	3 / 12	4 / 12	6 / 12
V	4 / 12	5 / 12	5 / 12	8 / 12	4 / 12	3 / 12	5 / 12

However, from table B.1. it might be more investigated to see whether too many lag variables are included in the model. In the case that too many lags are added, the result may not be distributed among the any other lag, it should be concentrated in any specific lag. By this assertion, any clear evidence can not be found to support that the test includes too many lags. Thus, the conclusion that the market integration *Granger cause* market liquidity, or *vice versa* can not be drawn. Some weak conclusion that might be drawn in this state is that, perhaps, those two variables are simultaneity in their effects. The interesting result of this Granger causality test is the inclusion of the autoregressive regressors instead of the Granger causality itself. From the test, it is seen that the AR of the measure of the level of stock market integration, especially for the degree of stock market integration – the mispricing variable, seems to have the distributed lagged effects. This is not

surprising because it might be the effect of the construction. The estimation of measures using roll regression method which has the effect of serial correlation effect incorporated.

Another interesting aspect of market quality is the market volatility. There are more cases, comparing to the case of market liquidity, but not sufficiently strong to conclude any direction of the Granger causality. Although the occurrences of market integration preceding to market volatility are more than the other way around, the number of the occurrence is not so much as to conclude. In addition, when observing the dispersion of significant lag, l, again, see no concentration in any lag period strongly enough to conclude any clear direction of precedence. Thus, the conclusion of these market integration and market volatility, Granger causality might be similar to those of market integration and market liquidity, but slightly stronger than the market liquidity case in term of market integration leading the market volatility.

5.4. Unit root test

The prerequisite of the cointegration test of time-series is the unit root test. If there exists the same degree of unit root of the series, the cointegration test is feasible. However, the unit root test,

Table 5.4.

The unit root test of the market liquidity

The unit root tests for market liquidity is performed. The results of the test are reported. Number of lag reported, is the number of lag variables included in the model. The null hypothesis is that the series has unit root at I(d). The sign * in each cell is different from normal notation using in t-statistics test. This * sign indicates the inability to reject the null hypothesis of the existence of I(d).

	Liquidity						
	Hong Kong	*Korea*	*Malaysia*	*Philippines*	*Singapore*	*Taiwan*	*Thailand*
no lag	-7.1970	-3.4587*	-4.8283	-7.5439	-6.2270	-4.3580	-6.1333
lag 1	-4.0625	-2.7086**	-3.8894	-4.7843	-4.3060	-3.3333*	-5.3410
lag 2	-3.2265*	-1.5258**	-3.2395*	-3.7964	-3.2276*	-2.8610**	-4.7994
lag 3	-3.1965*	-1.0913**	-3.2107*	-3.5699	-2.8702**	-2.4878**	-3.8873
lag 4	-3.0915*	-0.1917**	-2.5645**	-2.8833**	-2.1040**	-2.3527**	-4.1511
lag 5	-2.6300**	-0.1218**	-2.1862**	-3.1554*	-2.0176**	-2.3577**	-3.9020
lag 6	-2.4535**	0.3982**	-1.9651**	-3.5070*	-1.6732**	-1.7874**	-3.0310*
lag 7	-2.0831**	0.5071**	-1.7870**	-3.5519*	-1.2965**	-1.6575**	-2.4766**
lag 8	-2.0831**	0.5601**	-1.8205**	-3.3123*	-1.5347**	-1.6165**	-2.4848**
lag 9	-1.7464**	0.4591**	-1.5900**	-3.3760*	-1.7056**	-1.5541**	-3.0667*
lag 10	-1.9088**	0.2249**	-1.8757**	-3.2286*	-2.1260**	-1.6525**	-2.7117**

Table 5.6.

The unit root test of the degree of market integration

The unit root tests for the degree of market integration is performed. The results of the test are reported. Number of lag reported, is the number of lag variables included in the model. The null hypothesis is that the series has unit root at I(d). The sign * in each cell is different from normal notation using in t-statistics test. This * sign indicates the inability to reject the null hypothesis of the existence of I(d).

	Degree of integration						
	Hong Kong	*Korea*	*Malaysia*	*Philippines*	*Singapore*	*Taiwan*	*Thailand*
no lag	-5.3204	-4.9679	-4.9535	-7.4360	-6.3976	-4.7059	-4.5780
lag 1	-2.9384*	-3.2780*	-3.7099	-4.0630	-3.9030	-1.8203**	-2.9148*
lag 2	-2.3013**	-1.5846**	-3.5444	-2.2747**	-2.2904**	-2.0140**	-2.2357**
lag 3	-1.8401**	-0.9392**	-3.3729*	-4.2241	-1.7312**	-1.8684**	-1.4157**
lag 4	-1.9566*	-1.4952**	-2.3181**	-3.8123	-0.6942**	-1.6863**	-1.5507**
lag 5	-2.3650**	-1.4345**	-2.2187**	-2.0788**	-0.9999**	-2.1128**	-1.2217**
lag 6	-1.1257**	-2.0106**	-1.9805**	-2.2805**	-1.6274**	-1.2086**	-1.3935**
lag 7	-0.7850**	-1.8107**	-2.3136**	-1.2473**	-1.6219**	-2.0619**	-0.4168**
lag 8	-0.4758**	-1.6350**	-3.6673	-0.3736**	-1.6367**	-1.1027**	-1.9450**
lag 9	-1.2516**	-0.8373**	-3.4179*	0.0118**	-1.5275**	-1.4147**	-1.7086**
lag 10	-2.1459**	0.3779**	-4.5672	6.3929	-0.9792**	-0.1730**	-1.5164**

* has a unit root at 95%

From table 5.4., 5.5., 5.6., and 5.7., we can observe that almost all of the series; market liquidity, market volatility, the degree of stock market integration, and the likelihood of stock market integration; has unit root at any level of *d*, the lag included, using Dickey-Fuller critical value of 95% of the estimates. Only the result of the likelihood of stock market integration of Malaysia and Thailand totally rejects the null hypothesis of the existence of unit root at any level of *d*. This rejection may indicates that there exists stationarity in the likelihood of stock market integration of Malaysia and Thailand between the period January 1990 – December 1999. This implies that the likelihood of stock market integration of Malaysia and Thailand is stationary.

Referring to chapter 4 , the plotted figure of the degree of Asian stock markets integration and the likelihood of Asian stock markets integration shows the integration reverting process. This might not be the case. It belongs to some nonstationarity which implies there is changes in the level of integration through time. This conclusion is consistent with Bekaert and Harvey (1995). Moreover, Bhattacharya, et. al (1996) explains the jump during each period as the adjustment process of new equilibrium. This may support behavior of the estimated measure in chapter 4. When new equilibrium has been reached due to the innovation or change in fundamental of each market, the shock of the measure could be observed. After the shock, the new equilibrium might be reached, and the new

level of integration would be detected. However, this unit root test of the degree of Asian stock markets integration and the likelihood of Asian stock markets integration could confirm the time-varying behavior of the level of Asian stock markets integration.

Table 5.7.

The unit root test of the likelihood of market integration

The unit root tests for the likelihood of market integration is performed. The results of the test are reported. Number of lag reported, is the number of lag variables included in the model. The null hypothesis is that the series has unit root at I(d). The sign * in each cell is different from normal notation using in t-statistics test. This * sign indicates the inability to reject the null hypothesis of the existence of I(d).

	Likelihood of integration						
	Hong Kong	*Korea*	*Malaysia*	*Philippines*	*Singapore*	*Taiwan*	*Thailand*
no lag	-10.7783	-11.7336	-11.2085	-10.4732	-10.8518	-11.1970	-11.4821
lag 1	-7.5779	-7.4499	-7.7789	-7.4978	-6.5163	-7.9519	-7.8813
lag 2	-6.5806	-6.0801	-6.5635	-6.6855	-5.9499	-6.6179	-6.6654
lag 3	-5.5818	-4.6260	-5.4019	-5.6274	-5.4645	-5.6109	-5.4805
lag 4	-5.3162	-4.2642	-5.1639	-4.6522	-4.4487	-5.1863	-5.0816
lag 5	-4.9713	-4.1252	-4.6009	-4.3385	-3.6234	-4.6524	-4.6233
lag 6	-4.7325	-3.4494*	-4.5156	-4.1255	-4.2734	-4.5107	-4.4704
lag 7	-3.3783*	-3.3893*	-4.1496	-3.8334	-4.8664	-4.3549	-4.2812
lag 8	-3.3145*	-3.5440	-3.9426	-3.6049	-4.2564	-3.5196*	-4.0944
lag 9	-3.5138*	-3.4938*	-3.6359	-3.3578*	-3.7283	-3.3320*	-3.9694
lag 10	-3.2001*	-2.4773**	-3.5758	-3.2060*	-3.4773*	-3.4255*	-3.8845

* has a unit root at 95%

5.5. The cointegration test of the market quality and the level of market integration

From the previous section of unit root test, we conclude that almost all of the series in this study belongs to unit root at any level. This means that they are not stationary. The appropriate way to treat nonstationary variables is not so straightforward. It is quite possible for there to be a linear combination of integrated variables that is stationary; such variables are said to be cointegrated. Enders (1996) explains that any equilibrium relationship among the series implies that their stochastic trends must be linked. In this sense, the equilibrium relationship means that the variables cannot move independently of each other. This linkage among the stochastic trends necessitates that the variables be cointegrated. Since the trends of cointegrated variables are linked, the dynamic paths of such variables must bear some relation to the current deviation from the equilibrium relationship. Extending from Granger causality testing, any sufficient insight about the relationship between stock market quality and stock market integration is not gained. The cointegration test is performed to conclude the long run, or the equilibrium, relationship between them. In this study, the methodology of cointegration test provided by Engle and Granger (1987) is followed.

Each variable is paired to perform the cointegration test. They are

L-D : the stock market liquidity and the degree of stock market integration

V-D : the stock market volatility and the degree of stock market integration

L-L : the stock market liquidity and the likelihood of stock market integration

V-L : the stock market volatility and the likelihood of stock market integration

D-L : the degree of stock market integration and the likelihood of stock market integration

Table 5.8.

The cointegration test between the Asian stock market quality and

the level of Asian stock market integration

To investigate the long-run relationship between the level of Asian stock markets integration and the Asian stock markets quality, in term of liquidity and volatility, the conintegration test between them is performed. Each variable is paired to see the equilibrium relationship for them. L-D stands for liquidity and the degree of integration. V-D stands for volatility and the degree of integration. L-L stands for liquidity and the likelihood of integration. V-L stands for volatility and the likelihood of integration.

	Hong Kong	*Korea*	*Malaysia*	*Philippines*	*Singapore*	*Taiwan*	*Thailand*
L-D	-1.0604	-1.1319	-0.9784	-0.7899	-1.0466	-1.0618	-1.0377
	(-3.6788)**	(-3.2455)**	(-5.6987)**	(-3.3944)**	(-4.2947)**	(-3.948)**	(-3.9464)**
V-D	-0.7479	-0.6974	-0.9786	-0.9965	-0.9595	-0.7658	-0.7573
	(-3.7064)**	(-4.3057)**	(-4.0827)**	(-4.1944)**	(-3.6355)**	(-2.2153)**	(-3.1473)**
L-L	-1.0209	-0.9812	n/a	-0.9928	-1.0779	-1.1096	n/a
	(-3.8269)**	(-4.4901)**		(-4.6398)**	(-4.5454)**	(-4.3725)**	
V-L	-0.8496	-1.0017	n/a	-0.9723	n/a	-1.0694	n/a
	(-3.1092)**	(-4.6964)**		(-4.3312)**		(-4.0868)**	
D-L	-1.2893	-1.3026	n/a	-1.3379	-1.3175	-1.3105	n/a
	(-4.0417)**	(-4.0884)**		(-3.9890)**	(-3.5787)**	(-4.0266)**	

The results of the cointegration test for the seven countries are shown in table 5.8. Both the Dickey-Fuller test and the augmented Dickey-Fuller test are performed and shown in separated columns in table B.2. The t-statistics of each estimate is reported in the lower parenthesized figure in each cell. This t-statistics will be compared with the Dickey-Fuller critical values, [Dickey and Fuller (1979, 1981)], and Engle and Yoo critical values, [Engle and Yoo (1987)], to analyze whether there exists the cointegration. The null hypothesis of this cointegration is that there exists no cointegration between each pair of the variable. The rejection of the null hypothesis leads to the conclusion of the

existence of long run relationship. In other words, the rejection of the null hypothesis leads to the conclusion of the existence of the relationship between two variables in equilibrium.

From table 5.8., in almost all cases of the Dickey-Fuller test, there exists the equilibrium relationship between Asian stock market quality and the level of Asian stock market integration. The exceptional cases are the

1. the likelihood of stock market integration of Malaysia and Thailand, which are stationary according to the results of the test of unit root provided in the previous section,
2. the long run relationship between the likelihood of stock market integration in and the liquidity of stock market due to the stationarity of the likelihood of stock market integration for Malaysia and Thailand,
3. and, the long run relationship between the likelihood of stock market integration in and the volatility of stock market due to the stationarity of the likelihood of stock market integration for Malaysia and Thailand.

Looking at the augmented Dickey-Fuller test at the right part of the table B.2., it is found that the evidences supporting the cointegration are not as strong as the results from Dickey-Fuller test at the left part of the table. Although the results from the augmented Dickey-Fuller test are not so strong as the results from the Dickey-Fuller test, they do not provide the contradict results to each other. Thus, it could be concluded that the Asian stock market quality and the level of Asian stock market integration have the equilibrium relationship.

The last conintegration test is the test whether the two measures of the level of stock markets integration is consistent in long-run. In table 5.8., the last pair D-L is the result of the cointegration test between the degree of stock market integration and the likelihood of stock market integration. The results report that the two measures are related, at least in long-run. The rough conclusion can be drawn that the two measures are not inconsistent. They could yield quite the comparable in assessing the level of integration. However, this long-run relationship could not be tested for Malaysia and Thailand because they belong to different degree of the unit root. This may imply that the level of stock market integration, measured by the likelihood of stock market integration, for Malaysia and Thailand is stationary.

This finding leads to the implication that any policy implemented to invite the foreign capital flow to stock market which leads to the higher level of stock market integration may not be effective in short run. Instead, the long run effects might be the case. This might be because of the perception of

foreign investors that the long term commitment in capital market improvement and development is much more important than the sudden change which yield in just temporary shock. Not all the shock is the shock due to the change in fundamental, which will lead to the new equilibrium, though some of them might be.

5.6. The conclusion of the relationship between stock market quality and the level of stock market integration

In this chapter, the analysis concerning the relationship between the Asian stock market liquidity, volatility, the degree of stock market integration, and the likelihood of stock market integration is provided. The conclusions from the empirical findings could be drawn.

1. In Granger causality test which try to capture the precedence of events between the Asian stock market quality, the liquidity and volatility, and the level of Asian stock market integration, the degree of stock market integration and the likelihood of stock market integration, is performed. There is no clear evidence in either the quality leads the integration or the integration leads quality. There is weak evidence that the two events may be simultaneity. However, a few results display the lead of market quality to market integration which is too weak to conclude in this way.
2. The unit root test confirms consistently with the previous study, such as by Bekaert and Harvey (1995), that the level of stock market integration is not constant over time, it is time-varying. Also, almost all market quality time-series in all country, except the likelihood of stock market integration of Malaysia and Thailand, is nonstationary. This implies that there might be some trends in each interval of period.
3. From the Granger causality test, any insight concerning to the relationship between the stock market quality and the level of stock market integration can not be extracted sufficiently. The equilibrium relationship or the long run relationship is another interesting approach to be investigated. From cointegration test, it is found that there exist the long run relationship between the Asian stock market quality and the level of Asian stock market integration quite obviously, except for Hong Kong and Thailand for some cases. This finding may result in the consideration of policy making concerning the process of liberalization to invite the foreign capital inflow. Such policy making must be considered very carefully. The equilibrium relationship indicates the long term commitment rather than the short term effectiveness. To make any policy expecting that the effect will be sudden may be nonsense.