Market Integration and Financial Crisis: New Evidence from Asian Pacific Markets

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Abstract

We investigate the stock market integration among national equity indices in eight countries from the period of 1995 to 2009, which is then clustered into four sub-sample periods. The multivariate time serries analyses are employed to observe the degree and the existence of the integration. We find a cointegrating vector in each of three sub-sample periods. Interestingly, in the 1997 financial crisis, we find that there is no indication of cointegration relationship among the equity indices. The results of block causality tests and the accounting innovation analysis indicate that the short run dynamic interactions among the stock indices become more intense during the current financial crisis, and that the U.S. stock market has played dominant role in the regional markets.

Keywords: *stock market integration, financial crises.*

INTRODUCTION

A number of studies have been conducted on stock market integration and financial crises which focus on the 1997 Asian Financial Crisis (see, for example, Yang, Kolari, and Min, 2003 and Sheng and Tu, 2000). The general consensus is that the degree of integration among countries tends to change with a stronger integration during the crises that that before and after the crises. It is also interesting to note that U.S stock market has played an important influential role in some Asian countries during the 1998 Crisis period (Sheng and Tu, 2000).

The objective of this paper is to extend the analysis and examination presented in the previous papers on the stock market integration by including the recent financial crises. This paper emphasises on whether there is a significant difference in the stock market integration in the (1997) Asian Financial Crisis and the (2007) Recent Financial Crisis, as well as in the non-crisis periods. This is an interesting issue because those two crises are quite different in terms of the phenomena and factors causing them. The Asian financial crisis is an indication of a mixture of both crisis and panic as a result of the weak and collapse of Asia's financial systems (Sheng and

Tu, 2000). The recent financial crisis is sparked in the U.S. in 2007. At the time, the US financial market deeply suffered from the most significant economic shocks initiated by the sub-prime mortgage crisis leading to the downturn in housing market, and then worsened by the spike in commodity prices (Yellen, 2008). Webb (2009) mentions that this crisis is a representation of hubris or an overconfidence that the previously smooth system will never fail or even collapse. The devastating effects of the US financial market turmoil then widely spread throughout the world.

In particular, the focus of this paper is on the stock market integration among national equity indices in eight countries from 1995 to 2009. The multivariate time serries is employed to analyse the degree and the existence of the integration in the four sub sample periods. The paper is structured as following: Section One describes the condition of the eight stock markets in different periods; Section Two reviews the literature; Section Three discusses the research methodology; Section Four presents the empirical results; Section Five concludes.

LITERATURE REVIEW

The basic theoretical concept of financial market or stock market integration is adopted from the law of one price. In integrated financial markets, the assets with the same risk in different markets will result in the same yield when measured in a common currency (Stulz, 1981). However, if the yields are different across the markets, the arbitrage process will play an important role in eliminating the differences. Operationally, stock markets integration refers to the extent that markets' participants are enabled and obligated to take notice of events occurring in other markets by using all available information and opportunities, and is defined in terms of price interdependence between markets (Kenen, 1976). Stock market integration is affected by some factors (Roca, 2000), such as economic integration(Eun and Shim 1989), multiple listing of stocks, regulatory and the degree of information barriers, institutionalisation and securitisation, and market contagion (King and Wadwhani, 1990; Climent and Meneu, 2003).

Much research has been conducted, mainly by using a cointegration analytical framework, to find and analyse the existence of integration in stock market across countries. Once a cointegration vector is found among two or more stock markets, the existence of a long run relationship among them can be identified. Thus, stock price movements in one equity market will affect the others. The results, however, are sensitive to different sample selections and model specifications.

A research conducted by Chung and Liu (1994) find two cointegration vectors between the U.S and larger Asia Pacific stock markets. Masih and Masih (1999) report that some of ASEAN countries (Thailand, Malaysia, and Singapore) have a high degree of interdependence with other Asian (Hong Kong and Japan) and developed (the U.S. and the U.K.) stock markets. Furthermore, they also find one cointegration vector among several major Asian stock markets (Hong Kong, Korea, Singapore, and Taiwan) and major developed markets (Masih and Masih, 2001). Interestingly, Pretorius (2002) reports that the degree of bilateral trade and the industrial production growth differential significantly explains the correlation between two equity markets, and that the stock markets of countries in the same region are more interdependent than those in different regions, however, in emerging stock markets, this correlation might be smaller than what is widely perceived (Pretorius 2002).

Chan, Gup and Pan (1992) and DeFusco, Geppert and Tsetsekos (1996), mention that there is no cointegration between the U.S and several Asian emerging stock markets (Hong Kong, Taiwan, Singapore, Korea, Malaysia, Thailand, and the Philippines) in the 1980s and early 1990s. However, these findings somewhat contradict with those of Chung et al. (1994) and Masih et al. (1999). These imply that the interdependence among stock markets is not stable over time. For example, Hung and Cheung (1995) assert that there is no cointegration among stock markets in some Asia-Pacific countries (Malaysia, Hong Kong, Korea, Singapore, and Taiwan). However, they find that those stock markets were cointegrated after, but not before, the 1987 stock crash, once the stock prices are denominated at US dollars.

Arshanapalli and Doukas (1993) state the instability of stock market interdependence when they test the effect of inclusion or omission of the data for the 1987 crisis and

reveal that that it affects the results. They conclude that the stock markets were highly integrated during the crisis. Furthermore, Arshanapalli, Doukas and Lang (1995) show that after the 1987 crisis the stock markets in emerging markets (Malaysia, the Philippines, and Thailand) and developed markets (Hong Kong, Singapore, the U.S., and Japan) are more interdependent as they find cointegration in the post-crisis period, but not in the pre-crisis period. Other researchers, Liu, Pan and Shieh (1998) also confirm that there is an increase in the interdependence within Asian-Pacific regional markets and the stock markets in general post-the 1987 crisis. Similarly, Sheng and Tu (2000) document one cointegration vector between the U.S. and several Asian stock markets (Taiwan, Malaysia, China, Thailand, Indonesia, South Korea, the Philippines, Australia, Japan, Hong Kong, and Singapore) during the crisis, but none in the year before the crisis, when they observe the stock markets using daily data.

A research conducted by Yang, Kolari and Min (2003), examining the long-run relationship and short-run dynamic causal linkages among the U.S, Japanese, and ten Asian emerging markets using daily data of 1997-1998 periods, confirms that the stock markets of those markets have been more integrated after the 1997 Asian financial crisis than before the crisis. Both long-run cointegration relationship and short-run causal linkages among those markets become more significant during the crisis. Their findings also reveal that the degree of integration among those countries tends to change over time.

In conclusion, several points that may be drawn form the literature review. The implication is that liberalization of the financial sector in many countries has caused world stock markets to be more integrated. The degree of integration among international equity markets has increased after the 1987 stock market crash and the 1997 Asian financial crisis. Empirical evidence is given by the presence of cointegration vectors and significant short-run causal linkages. It is also worth noting that the stock markets of countries in the same region may be more interdependent than those in different regions.

RESEARCH METHODOLOGY

Data and Samples

A stock market price index or stock market index can be viewed simply as a portfolio of individual stocks. The index level corresponds to some average of the price levels of individual shares. The stock market index can then commonly be use as an indicator of the market performance. There are several factors that determine the level of the index, such as breadth of index, weighting system, capitalization adjustment, and dividend effect (Brailsford, Heaney and Bilson, 2004).

The stock market index of a country may also be an indicator of short-term portfolio investment movement in the country. Stock index movements may reflect the attractiveness of a country for investments. An upward trend of a stock market index means that there is an increase in demand of the listed shares in the market indicating that investors are attracted to buy shares and invest their fund in the country. In contrast, the downward trend movement of the index indicates that the investors are unlikely to continuously hold the listed shares.

We use the daily closing stock prices indices[1] of the eight stock markets from the period of 1995-2009. The indices are: the NYSE Composite of New York Stock Exchange-USA (NYSEALL); the ASX All Ordinaries Index of Australia (AUSTOLD); the NIKKEI 225 Stock Average of Japan (NIKKEI); HANG SENG of Hong Kong; Korea SE Composite (KOSPI) of Korea; Taiwan SE Weighted of Taiwan (TAIWGHT); the SHANGHAI SE Composite of China (SHANGHAI); and the Jakarta SE Composite of Indonesia (JAKCOMP). All indices are in natural logarithm forms.

The data are then separated into four sub-sample periods, as follows:

1. The period of January 1995 – June 1997 (1st non crisis period)
2. The Asian (1997) financial crisis period: from July 1997 – June 1998, as suggested by Sheng et al (2000) and Yang et al (2003).
3. The period of July 1998 – June 2007 (2nd non crisis period)

[1] The daily data are collected from the Thompson Financial electronic database.

4. The recent (2007) financial crisis period from July 2007 – May 2009, as it is stated in several publications (http://en.wikipedia.org, www.globalissues.org, www.atypon-link.com)

Empirical Framework

We employ a multivariate time series analysis to examine the presence of long run equilibrium and dynamic relationships among the indices. The two most appropriate models that one of which may suitable for this study are VAR and VECM.

In the Vector autoregressive model (VAR) all of the variables are endogenous, and symmetrically treated. The general form of a VAR model is as follows:

$$Bx_t = \Gamma_o + \sum_{i=1}^{p} \Gamma_i x_{t-i} + \varepsilon_t$$

The VAR requires that all variables be stationary[2], and the appropriate lag length is data driven. Thus, in order to define the appropriate lag length, some tests of information criteria that will be applied in this study include the likelihood ratio (LR) test; Akaike Information Criterion (AIC); and Schwarz Bayesian Criterion (SC).

The likelihood ratio test is based on asymptotic theory and is an F-type approximation. This test actually compares a restricted VAR (less lags) to an unrestricted VAR (more lags). However, the shortcoming of this test is that it may not be useful in small samples. In addition, the likelihood ratio test is valid when the restricted model is tested. Because of the limitations of the likelihood ratio test, multivariate generalization of AIC and SC may be the most suitable alternatives. The minimum values of AIC and/or SC may validly indicate the appropriate lags length, as long as the model's residual has no serial correlation problem. Otherwise, the lag

[2] There are several available tests for testing for a unit root, the most common is the Augmented Dicky-Fuller (ADF) test. Non-stationary variables may be made stationary by differencing or de-trending process.

length may be too short. Thus, it is necessary to re-estimate the model using lag length that yield serially uncorrelated.

We also employ cointegration analysis within a vector error correction model (VECM). Although cointegration refers to a linear combination of non-stationary series, or *I*(1), it is a VAR augmented by the error correction term. The VECM, in general, takes the form as

$$\Delta x_t = \Gamma_o + \sum_{i=1}^{p} \Gamma_i \Delta x_{t-i} + \alpha\beta' x_{t-1} + v_t$$

Thus, if the parameters of error correction term (ECT), called speed of adjustments (α) in VECM, are zero, then VECM reverts to a VAR in first differences. However, if the speed of adjustments are not zero, the larger the speed of adjustments, the greater the response to previous periods' deviation from the long run equilibrium. A cointegration relationship is a long term or equilibrium phenomenon, although it is possible that cointegrating variables may deviate from their relationship in the short run. The VECM result is also sensitive to its lags length. Thus, it is essential to use appropriate lag length to obtain the appropriate outcomes by conducting the lag order selection criteria (LR, AIC, or SC) tests, as it is used in VAR.

Cointegration requires that all variables in a model to be integrated of the same order. In order to test the existence of cointegrated variable, one may use the Engle-Granger (EG) test, which is a residuals-based approach, or the Johansen Cointegration test. In the case of a cointegration relationship does not exist, a VAR analysis in first difference will then be the correct specification to conduct the estimation.

Both in VAR and VECM, a block causality test is applied to examine whether the lags of one variable enter into the equation for another variable. A variable (y_1) is said to be a granger-cause of another (y_2) if the present value of y_2 can be predicted with greater accuracy by using past values of y_1, all other information being identical (Thomas, 1997). If y_1 granger-causes y_2, the parameters of lags of y_1, β_i's, should not equal zero in the equation of y_2. The null hypothesis of $\beta_i = 0$ (i=1,2,…..n) is then

tested by using Wald-statistic[3]. However, it is worth noting that granger-causality means a correlation between the current value of one variable and the past (lags) value of others. It does not mean that movements of one variable physically cause movements of another (Brooks, 2002). Thus, Granger causality simply implies a chronological ordering of movements of the series.

A direct interpretation of the cointegration relations, as well as in a traditional VAR analysis, may be difficult or misleading (Lutkepohl and Reimers, 1992; Runkle, 1987), accounting innovation analyses, consist of impulse responses and variance decomposition analyses, can provide a solution to the interpretation problem, and might be the most suitable method to explain the short run dynamic structure of market linkages (Yang et al, 2003). The analyses provide an insight on whether changes in the value of a given variable have positive or negative effect on other variables in the models, or how long it would take for the effect of that variable to work through the models.

An impulse response analysis traces out the responsiveness of the dependent variables in VAR to shocks on individual error terms. Since Cholesky factorization to orthogonalized VAR innovations, which commonly applied in VAR analyses, are sensitive to the ordering of the variables in the VAR model when the residual covariance matrix is non-diagonal, the generalized impulse responses analysis is employed. The Generalized Impulses as described by Pesaran and Shin (1998) constructs an orthogonal set of innovations that does not depend on the VAR ordering. The generalized impulse responses from an innovation to the j-th variable are derived by applying a variable specific Cholesky factor computed with the j-th variable at the top of the Cholesky ordering. Dekker, Sen and Young (2001) found that the generalized approach provided more accurate results than the traditional orthogonalized approach for both impulse response and forecast error variance decomposition analysis.

Forecast error variance decomposition, meanwhile, refers to the proportion of the movements in a sequence due to its own shock versus shocks to the other variables

[3] The Wald statistic has a chi-square distribution.

(Enders, 2004). This analysis separates the variation in an endogenous variable into the component shocks to the system. Thus, the variance decomposition provides information about the relative importance of each random innovation in affecting the variables in the system. It determines how much of the s-step ahead forecast error variance of a given variable is explained by innovations to each explanatory variable. To some extent, the analyses, impulse responses and variance decompositions, offer very similar information.

EMPIRICAL RESULTS

The ADF tests applied on the series in all the sub-sample periods to reveal the existence of unit root in the series result in that all series of the sub-sample periods contain unit root meaning that the series are non stationary. The results largely consistent with Masih et al. (1999, 2001), which verify the existence of a unit root for all Asian stock market index prices.

The examination then continues with determining the appropriate lag length of the series to get the correct outcomes. The information criteria (LR, AIC, and SC) tests used to check the series, however, give some conflicting results. The lag lengths, suggested by AIC and SC, mostly suffer from serial correlation problem in their model's residual indicating that the lag lengths may be too short. We then use the appropriate lag lengths given by the LR test, since their residuals are not serially uncorrelated or white noise. The appropriate lags length are reported in Table 1

Insert Table 1 Here

Considering the number of appropriate lags, the number of cointegrating vectors is tested by using the maximum likelihood based λmax and λtrace statistics introduced by Johansen (1988, 1991). Johansen and Juselius (1990) also suggest that the λtrace tends to have more power than the λmax because λtrace takes into account all degrees

of freedom (n-r) of the smallest eigenvalues, then the number of cointegration vectors suggested by the λtrace statistic would be employed, if there are conflicting results between λmax and λtrace statistic. With exclusion of linear trend and 95% critical values, Table 1 also presents the test outcomes.

Table 1 shows that all indices have long run equilibrium in both non-crisis periods. Our findings show supportive evidence for Liu et al (1998), and indicate that the cointegration analysis will validly estimate to the series of the periods.

Interestingly, we explore two sets of results in two different crisis periods. First, the cointegration relationship does not appear in the series during the Asian financial crisis period, which is inconsistent with that of Yang et al (2003) and Sheng et al (2000). This fact may happen because the 1997 financial crisis, originally emerged in South East Asia region, might significantly affect the Asian stock markets, mainly the ASEAN markets only, but not the US and Australia markets. Some differences in macro-economic; stock market characteristics; geographical condition most likely reduce the contagious effect of the 1997 financial crisis (Eun et al, 1989; King et al, 1990; Pretorius, 2002). The absence of cointegrating vector has a consequence that the cointegration analysis framework is not possible to estimate the series. Instead, the VAR in first difference will validly be applied.

Second, during the recent financial crisis period, we find a cointegrating relationship among the observed indices. This indicates that all of the eight stock markets indices would converge to their long run equilibrium, even though some dispersion might exist in the short run period. The result implies that the 2007 financial crisis, which was originally occurred in the U.S., had greater impact on the countries' stock indices than that of the 1997 financial crisis.

Considering the outcomes of the Johansen Cointegration test, the cointegration analysis will then only validly be applied to estimate the series in three sub-sample periods, which are both non-crisis periods and the recent financial crisis period. The NYSE Composite will be treated as the world index in these analyses. Based on t-statistic at the 5% level of significance, Table 2 shows that all variables, except

KOSPI and TAIWGHT, have significant influence in the cointegrating relation in the first non crisis period, while NYSEALL; NIKKEI; KOSPI; SHANGHAI; and JAKCOMP significantly impact the cointegrating vector in the second period of non crisis. In addition, NYSEALL; AUSTOLD; HANGSENG; KOSPI; SHANGHAI; and TAIWGHT significantly contributed to the long run equilibrium of the observed indices in the current financial crisis period. The significant contributions from NIKKEI and JAKCOMP to the cointegrating relation, however, vanished during the recent crisis period.

Insert Table 2 Here

Table 3 presents the speed of adjustment coefficients of the error correction term (α_i) that have important implications for the dynamics of the system. The negative value of the significant speed of adjustment indicates a downward long run adjustment, while the positive one implies an upward long run adjustment.

Using the same critical value of 5% level, the speed of adjustment coefficients of the first non crisis period's cointegrating vector for KOSPI; SHANGHAI; and JAKCOMP are statistically zero. This means that the cointegrating vector has no contribution to the convergence of those variables to their long run path, although SHANGHAI and JAKCOMP have significant contribution to the cointegrating vector.

In the second non crisis period, all indices, except AUSTOLD; NIKKEI; and JAKCOMP, have insignificant speed of adjustment coefficients, which implies that the cointegrating vector significantly contributes only to those three indices to their long run equilibrium.

The speed of adjustment coefficient for AUSTOLD; JAKCOMP; and HANGSENG are insignificant during the current crisis period. As can be seen in Table 2 and Table 3, JAKCOMP has no significant impact on the cointegrating vector, and the cointegrating vector does not contribute to the convergence of the index in the long

run. Though the cointegrating vector has no contribution to the convergence of HANGSENG in long run path, the index significantly influences the cointegrating vector. In comparison, NIKKEI reacts to a disequilibrium within the cointegrating vector, even though the index has no significant impact on the cointegrating vector.

Insert Table 3 Here

As discussed above, a VECM is not appropriate for estimation for the period of Asian financial crisis, since we could not detect any cointegration vector in the series. Enders (2004) suggests that a VAR analysis in first difference will then be the correct specification to conduct the estimation of the series. A VAR analysis, however, requires that all variable must be stationary. Therefore, it is necessary to alter the non stationary variable into the stationary one by differencing process. Following the alteration, re- identifying the appropriate lag length is conducted. Three lag lengths are then found to be the most suitable one for the VAR in first difference to estimate the series during the period. The complete result of the VAR estimation can be seen in APPENDIX 1.

After estimating the models using the correct approaches, we then search the existence of granger causality among variables for each model. The objective of granger-causality test is to examine whether the lags of one variable (y_1) enter into the equation for another variable (y_2)

This study conducts the causality tests for the series in all sub sample periods. For the both periods of non-crisis and the recent financial crisis period, the Pairwise Granger Causality based on Vector Error Correction (VEC) test is employed. Alternatively, the Pairwise Granger Causality based on VAR will test the series during the period of Asian financial crisis. The results are presented in Table 4.

Insert Table 4 Here

Using a 5% level of significance, the results of granger causality test for each stock index per period demonstrate that NYSEALL granger causes most of the other indices in all observation periods. It suggests that changes or movements in most of the observed indices appeared to lag those of NYSEALL. However, during January 1995 – June 1997, NYSEALL did not granger cause SHANGHAI (as well as in the Asian financial crisis period and during July 1998 – June 2007); KOSPI; and TAIWGHT. In the Asian financial crisis period, the NYSEALL did not significantly granger-cause JAKCOMP and SHANGHAI. Thus, the past value of NYSEALL can not be used to precisely forecast the present value of the both indices during the first crisis. During the current crisis, all of the indices were granger caused, mostly in uni-directional forms, by the NYSE Composite.

In Asia scope, the current values of the Asian indices mostly correlated with the past value of NIKKEI during the 2007 financial crisis. Moreover, NIKKEI was the only Asian index that had bi-directional causality with NYSEALL in both crisis periods. Meanwhile, movements of JAKCOMP would be incorrectly forecasted by using the past values of the other Asian indices, although it was still granger caused by NYSEALL in both periods. Interestingly, JAKCOMP, as well as HANGSENG, significantly granger caused NYSEALL in the period of the Asian financial crisis.

The tests also find that more indices are significantly granger caused by another in crisis periods compared to those in non-crisis periods implying that short run causal linkages among these stock markets were strengthened during the crises.

Appendix 2 presents the complete results of the generalized impulse responses analysis for each observation period. In general, the results explain that contemporaneous responses of an observed index to a unit shock to another continuously increased for the time periods, especially during the 2007 financial crisis when the responses rocketed. NYSEALL, for instance, increasingly responded to shocks in another during the periods. NYSEALL, however, became the most influential index that plays a dominant role in the regional equity market, predominantly during the recent financial crisis, since a shock to NYSEALL resulted in the greatest contemporaneous reaction by most of the observed indices.

In Asia – Australia perspective, a shock to HANGSENG greatly affected AUSTOLD and SHANGHAI movements after the Asian financial crisis period. In addition, although its position has been taken over by NYSEALL in the current crisis period, HANGSENG became the most influential index for JAKCOMP during the Asian financial crisis. This confirms the research conducted by Bhattacharyya and Banerjee (2004) that Hong Kong capital market leads the other Asian markets.

While impulse response functions trace the effects of a shock to one endogenous variable on to the other variables in the VAR system, variance decomposition separates the variation in an endogenous variable into the component shocks to the VAR. The forecast error variance decomposition tells the proportion of the movements in a sequence due to its own shock versus shock to the other variable. Thus, a shock to the *i*-th variable will not only affect that variable, but also can be transmitted to all of the other variables in the system.

Appendix 3 shows the complete results of the forecast error variance decomposition for the eight stock indices in each sub sample period. As can be seen in the Appendix, in general, the percentage value of the error variance attributable to own shocks continuously declined during the observation periods. In the 2007 crisis period, the percentage values were even lower for all indices compared to those in the other periods. This indicates that movements of an index are more likely influenced by the innovations in other indices than by its own shocks.

NYSEALL apparently has more explanatory power to the movements of the others in the 2007 crisis period than in the period of July 1998 – June 2007. Moreover, in several markets' indices, such as AUSTOLD; HANGSENG; NIKKEI; and KOSPI, the proportion of the movement in an index caused by its own shock is less than that caused by shock to NYSEALL. This occurrence is different from the one during January 1995 – June 1997, where the proportion of the movement in a sequence is mainly due to its own shocks.

CONCLUSION

This study examines the stock market integration among national equity indices in eight countries from 1995 to 2009, separated into four sub periods: before the (1997) Asian financial crisis, during the Asian financial crisis, after the crisis, and during the recent financial crisis.

The Johansen Cointegration Test reveals the existence of a cointegrating vector in three sub-samples implying that the stock markets are interdependent and have long run equilibrium. The VECM estimation results also show that most indices have significant contribution to the cointegrating relationship during the sub-sample periods. In contrast, the test shows that there is no indication of cointegrating relationship among the indices during the 1997 financial crisis. These findings somewhat confirm those of Arshanapalli et al (1993) and Yang et al (2003) that the market interdependent is unstable and tends to change overtime.

The accounting innovation analysis together with block causality tests' results give evidences that NYSEALL has played dominant role in most of the indices' movements during the observation periods, and its role become even stronger during the recent financial crisis. The block causality tests' results also confirm that number of causal linkage among the indices increase during the crisis periods. These outcomes clarify that the short run dynamic interactions among the indices seem to be more intense during the observation periods, especially in the recent financial crisis.

REFERENCE

Arshanapalli, B. and Doukas, J. 1993, 'International Stock Market Linkages: Evidence from the pre- and post-October 1987 Period', *Journal of Banking and Finance*, 17 (1): 193-208.

Arshanapalli, B., Doukas, J. and Lang, L. 1995, 'Pre and post-October1987 Stock Market Linkages between U.S and Asian markets', *Pacific-Bacin Finance Journal*, 3 (1): 57-73.

Bhattacharyya, M. and Banerjee, A. 2004, 'Integration of Global Capital Markets: An Empirical Exploration', *International Journal of Theoritical & Applied Finance*, 7 (4): 385-405

Brailford, T., Heaney, R. and Bilson, C. 2004. *Investment: Concepts and Applications, Second Edition.* Thomson Learning: Australia.

Brooks, C. 2002. *Introductory Econometrics for Finance*. Cambrige University Press: Cambrige.

Chan, K.C., Gup, B.E. and Pan, M. 1992, 'An Empirical Analysis of Stock Prices in Major Asian Markets and the United States'. Financial Review, 27 (2): 289-307.

Chung, P. and Liu, D. 1994, 'Common Stochastic Trend in Pacific Rim Stock Markets', *Quarterly Review of Economics and Finance*, 34: 241-259.

Climent, F. and Meneu, V. 2003, 'Has 1997 Asian Crisis Increased Information Flows between International Markets', *International Review of Economics and Finance*, 12(1): 111-143.

DeFusco, R.A., Geppert, J.M. and Tsetsekos, G.P. 1996, 'Long-run Diversification Potential in Emerging Stock Markets', *Financial Review*, 31(2): 343-363.

Dekker, A., Sen, K. and Young, M. 2001. 'Equity Market Linkage in the Asia Pacific Region: A Comparison of the Orthogonalized and Generalized VAR Approaches'. *Global Finance Journal*, 12: 1-33.

Enders, W. 2004. *Applied Econometric Time Series: Second Edition*. John Wiley & Sons: USA.

Engle, R. F. and Granger, C.W.J. 1987, 'Cointegration and Error Correction: Representation, Estimation, and Testing', *Econometrica*, 55: 251-76.

Engle, R.F. and Kozicki, S. 1993, 'Testing for Common Features', *Journal of Business and Economic Studies*, 11: 83-113.

Eun, C.S. and Shim, S. 1989, 'International Transmission of Stock Market Movements', *Journal of Financial and Quantitative Analysis*, 24 (2): 241-56.

Hung, B. and Cheung, Y. 1995, 'Interdependence of Asian Emerging Equity Markets', *Journal of Business Finance and Accounting*, 22 (2): 281-88.

Johansen, S. 1988, 'Statistical Analysis of Cointegration Vector', *Journal of Economic Dynamics and Control*, 12(2-3): 231-54.

Johansen, S. and Juselius, K. 1990, 'The Full Information Maximum Likelihood Procedures for Inference on Cointegration with Applications to the Demand for Money', *Oxford Bulletin of Economics and Statistics*, 52(2): 169-210.

Kasa, K. 1992, 'Common Stochastic Trends in International Stock Markets', *Journal of Monetary Economics*, 29: 95-124.

Kenen, P.B. 1976, 'Capital Mobility and Integration: A Survey', *Princeton Studies in International Finance No. 39*, Princeton University: USA.

King, M and Wadwhani, S. 1990, 'Transmission of Volatility between Stock Markets', *Review of Financial Studies*, 3 (1): 5-33.

Liu, Y.A., Pan, M.S. and Shieh, J.C.P. 1998, 'International Transmission of Stock Price Movements: Evidence from the U.S. and Five Asian-Pacific Markets', *Journal of Economics and Finance*, 22 (1): 59-69.

Lutkepohl, H. and Reimers, H.E. 1992. 'Impulse Response Analysis of Cointegrated System', *Journal of Economic Dynamics and Control*, 16: 53-78.

Masih, A.M.M. and Masih, R. 1999, 'Are Asian Stock Markets Fluctuations Due to Mainly to Intra-regional Contagion Effects? Evidence Based on Asian Emerging Markets', Pacific-Basin Finance Journal, 7 (3): 251-82.

Masih, R. and Masih, A.M.M. 2001, 'Long and Short-term Dynamic Causal Transmission amongst International Stock Markets', *Journal of International Money and Finance*, 20: 563-87.

Pretorius, E. 2002, 'Economic Determinants of Emerging Market Stock Market Interdependence', *Emerging Markets Review*, 3: 84-105.

Reilly, F.K. and Brown, K.C. 2003. *Investment Analysis and Portfolio Management, Seventh Edition*. Thomson Learning: Ohio.

Roca, E.D. 2000. *Price Interdependence among Equity Markets in the Asia-Pacific Region: Focus on Australia and ASEAN*. Ashgate: Aldershot.

Runkle, D.E. 1987. ' Vector Autoregressions and Reality'. *Journal of Business and Economic Statistics*, 5(4): 437-442.

Serletis, A. and King, M. 1997, 'Common Stochastic Trends and Convergence of European Union Stock Markets', *The Manchester School*, 65(1): 44-57.

Sheng, H. and Tu, A. 2000, 'A Study of Cointegration and Variance Decomposition among National Equity Indices before and during the Period of the Asian Financial Crisis', *Journal of Multinational Financial Management*, 10 (3): 345-65.

Stulz, R. 1981, 'On the Effects of Barriers to International Investment', *Journal of Finance*, 36: 923-934.

Thomas, R.L 1997. *Modern Econometrics: an Introduction*. Addison-Wesley: Harlow.

Webb, Allen P. 2009. Management lessons from the financial crisis: A conversation with Lowell Bryan and Richard Rumelt. *The McKinsey Quarterly*, June

Yang, J., Kolari, J.W. and Min, I. 2003, 'Stock Market Integration and Financial Crises: the Case of Asia', *Applied Financial Economics*, 13: 477-486.

Yellen, Janet L. (2008), 'Economic Prospects for the US Economy from a Monetary Policymaker's Perspective', *CFA Institute Annual Conference Vancouver*, www.cfapubs.org.

http://en.wikipedia.org/wiki/Financial_crisis_of_2007%E2%80%932009, visited June 2009

http://www.globalissues.org/article/768/global-financial-crisis, visited June 2009

http://www.atypon-link.com/AEAP/doi/abs/10.1257/aer.98.2.339, visited June 2009

TABLES

TABLE 1
Lags Order and Number of Cointegrating Vector Tests

Periods	Lag Order	Number of Cointegrating Vector(s)
2 jan 95 -30 jun 97	2	1
1 jul 97 - 30 jun 98	6	0
1 jul 98 - 30 jun 07	6	1
1 jul 07 - 11 may 09	6	1

Note:
the tests based on sequential modified LR test statistic (each test at 5% level)

TABLE 2
Estimates of Cointegrating Vector

Cointegrating Equation:	PERIODS		
	January 1995 – June 1997	July 1998 – June 2007	July 2007 – May 2009
NYSEALL	1.0000000	1.000000	1.000000
AUSTOLD	-0.444534 0.138210 **[-3.21638]**	-0.143217 (0.19372) [-0.73931]	1.875325 (0.89023) **[2.10655]**
HANGSENG	-0.465916 0.0830679 **[-5.60886]**	0.039991 (0.11502) [0.34768]	-1.833022 (0.66305) **[-2.76454]**
NIKKEI	-0.071050 0.038652 **[-1.83821]**	-0.513153 (0.10538) **[-4.86966]**	-0.917174 (0.60615) [-1.51312]
KOSPI	-0.032609 0.052419 [-0.62209]	0.359709 (0.07766) **[4.63194]**	5.182223 (1.03456) **[5.00913]**
SHANGHAI	-0.054542 0.024861 **[-2.19389]**	-0.091178 (0.05545) **[-1.64441]**	-0.458509 (0.17880) **[-2.56436]**
TAIWGHT	-0.036218 0.031721 [-1.14175]	0.194391 (0.12666) [1.53470]	-2.776947 (0.60432) **[-4.59515]**
JAKCOMP	-0.111738 0.063456 **[-1.76087]**	-0.335629 (0.08723) **[-3.84782]**	-0.456625 (0.45026) [-1.01414]
C	1.864440	-4.401370	-4.423218

Note: cointegration with unrestricted intercepts and no trends in CE and VAR.
Standard errors in ( ) & t-statistics in [ ], level of significance 5%

TABLE 3
Speed of Adjustment Parameter of the Error Correction Term

Error Correction:	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
Period of January 1995 – June 1997								
ecm1(α1)	-0.019989 0.011682 **[-1.71100]**	0.031587 0.010970 **[2.87946]**	0.088466 0.019006 **[4.65464]**	0.079622 0.022826 **[3.48827]**	0.001114 0.022755 [0.04894]	0.041859 0.051293 [0.81607]	0.103617 0.025002 **[4.14436]**	0.010265 0.015266 [0.67242]
Period of July 1998 – June 2007								
Ecm3 (α3)	-0.002232 (0.00271) [-0.82492]	0.003448 (0.00164) **[2.10632]**	-0.002639 (0.00351) [-0.75266]	0.011923 (0.00347) **[3.43824]**	-0.004348 (0.00499) [-0.87203]	0.003584 (0.00391) [0.91654]	0.005639 (0.00407) [1.38669]	0.018740 (0.00400) **[4.68909]**
Period of July 2007 – May 2009								
ecm1 (α4)	-0.023340 (0.00608) **[-3.83663]**	-0.001743 (0.00333) [-0.52343]	-0.002773 (0.00640) [-0.43330]	-0.009036 (0.00474) **[-1.90515]**	-0.015075 (0.00507) **[-2.97232]**	0.018077 (0.00641) **[2.81831]**	-0.010770 (0.00463) **[-2.32388]**	-0.003188 (0.00512) [-0.62293]

Note : 5% Level of significance
Standard errors in ( ) & t-statistics in [ ]

TABLE 4
Pairwise Granger Causality/Block Exogeneity Wald Tests

Dependent variable	Exclude	Jan 1995 – Jun 1997 (df 2) *		Jul 1997 – Jul 1998 (df 3)#		Jul 1998 – Jun 2007 (df 6) *		Jul 2007 – May 2009 (df 6) *	
		Chi-sq	Prob.	Chi-sq	Prob.	Chi-sq	Prob.	Chi-sq	Prob.
NYSEALL	AUSTOLD	1.4741	0.4785	0.0509	0.9970	6.5999	0.3594	8.1156	0.2298
	HANGSENG	2.0641	0.3563	29.462	0.0000	10.996	0.0885	3.6959	0.7177
	NIKKEI	1.2403	0.5379	9.8919	0.0195	5.2807	0.5083	14.141	0.0281
	KOSPI	3.8811	0.1436	2.3364	0.5056	8.9712	0.1752	6.8842	0.3317
	SHANGHAI	4.2976	0.1166	3.9984	0.2616	6.7527	0.3443	6.1120	0.4108
	TAIWGHT	0.2530	0.8812	0.4945	0.9201	14.734	0.0224	7.3918	0.2861
	JAKCOMP	6.6019	0.0368	13.628	0.0035	6.5800	0.3614	7.5358	0.2741
AUSTOLD	NYSEALL	186.63	0.0000	153.99	0.0000	1006.7	0.0000	373.21	0.0000
	HANGSENG	3.1010	0.2121	23.653	0.0000	11.216	0.0819	17.166	0.0087
	NIKKEI	0.2056	0.9023	8.1922	0.0422	10.924	0.0907	13.902	0.0307
	KOSPI	1.0785	0.5832	2.6404	0.4504	5.3171	0.5038	12.177	0.0581
	SHANGHAI	4.2108	0.1218	4.6346	0.2006	5.7611	0.4505	24.456	0.0004
	TAIWGHT	0.3310	0.8474	1.3265	0.7228	5.2583	0.5111	8.6151	0.1964
	JAKCOMP	2.0204	0.3641	4.6359	0.2005	3.2625	0.7752	24.605	0.0004
HANGSENG	NYSEALL	142.07	0.0000	37.042	0.0000	470.48	0.0000	150.01	0.0000
	AUSTOLD	8.8643	0.0119	0.3603	0.9483	4.9762	0.5469	7.8487	0.2494
	NIKKEI	3.6403	0.1620	1.7397	0.6281	20.229	0.0025	22.962	0.0008
	KOSPI	0.3417	0.8430	8.7142	0.0333	11.782	0.0670	12.881	0.0450
	SHANGHAI	1.6670	0.4345	17.330	0.0006	5.7323	0.4538	8.5893	0.1980
	TAIWGHT	0.4223	0.8096	2.5604	0.4645	3.0328	0.8047	10.203	0.1164
	JAKCOMP	5.0911	0.0784	12.271	0.0065	2.6789	0.8479	7.0103	0.3199
NIKKEI	NYSEALL	28.056	0.0000	25.514	0.0000	326.33	0.0000	302.81	0.0000
	AUSTOLD	1.9535	0.3765	4.4681	0.2151	6.7417	0.3454	9.0001	0.1736
	HANGSENG	1.0095	0.6037	0.08916	0.9931	4.2599	0.6415	3.3811	0.7597
	KOSPI	1.3216	0.5164	3.9724	0.2645	4.9848	0.5458	15.742	0.0152
	SHANGHAI	2.6499	0.2658	5.4959	0.1389	9.1521	0.1652	10.698	0.0982
	TAIWGHT	0.8930	0.6399	1.5205	0.6775	2.5358	0.8644	5.3348	0.5016
	JAKCOMP	0.9502	0.6218	1.2414	0.7431	6.9162	0.3287	10.605	0.1013
KOSPI	NYSEALL	4.6055	0.1000	12.135	0.0069	260.15	0.0000	117.14	0.0000
	AUSTOLD	0.0650	0.9680	7.9567	0.0469	11.053	0.0867	13.618	0.0342
	HANGSENG	1.7507	0.4167	2.3723	0.4988	7.8753	0.2474	5.2492	0.5123
	NIKKEI	4.2936	0.1169	8.0526	0.0449	5.8270	0.4428	24.736	0.0004
	SHANGHAI	0.3999	0.8188	4.6072	0.2029	2.4567	0.8733	8.0162	0.2369
	TAIWGHT	1.3482	0.5096	10.787	0.0129	7.4375	0.2823	5.2527	0.5118
	JAKCOMP	0.1490	0.9282	3.7390	0.2911	3.1459	0.7903	9.1916	0.1631
SHANGHAI	NYSEALL	3.3662	0.1858	2.0251	0.5672	4.8839	0.5588	29.675	0.0000
	AUSTOLD	1.0537	0.5905	2.4837	0.4782	2.7951	0.8341	5.4642	0.4858
	HANGSENG	0.1812	0.9134	8.9524	0.0299	5.5268	0.4782	4.3986	0.6229
	NIKKEI	2.7344	0.2548	0.6674	0.8808	3.8906	0.6915	9.1805	0.1637
	KOSPI	1.3309	0.5140	1.3699	0.7126	5.4329	0.4896	1.8424	0.9336
	TAIWGHT	0.0049	0.9976	1.6757	0.6423	4.2977	0.6365	0.8907	0.9894
	JAKCOMP	0.9621	0.6181	3.7130	0.2942	2.3430	0.8856	11.211	0.0820
TAIWGHT	NYSEALL	0.0635	0.9688	21.502	0.0001	124.28	0.0000	101.19	0.0000
	AUSTOLD	1.8241	0.4017	3.2430	0.3556	4.1513	0.6562	11.614	0.0711
	HANGSENG	0.2320	0.8905	4.1792	0.2427	10.413	0.1083	4.4170	0.6204
	NIKKEI	1.3115	0.5191	5.1192	0.1633	5.5154	0.4796	11.691	0.0692

	KOSPI	3.0874	0.2136	6.2124	0.1017	10.968	0.0894	7.3980	0.2856
	SHANGHAI	0.1129	0.9451	2.2327	0.5255	7.0574	0.3156	6.7103	0.3485
	JAKCOMP	4.0394	0.1327	2.6863	0.4426	18.702	0.0047	11.754	0.0677
JAKCOMP	NYSEALL	48.367	0.0000	4.9693	0.1741	118.81	0.0000	85.982	0.0000
	AUSTOLD	5.3443	0.0691	1.2304	0.7457	13.454	0.0364	8.1020	0.2307
	HANGSENG	9.9209	0.0070	6.3102	0.0975	8.6803	0.1924	8.9418	0.1769
	NIKKEI	0.4588	0.7950	0.7539	0.8605	13.649	0.0338	5.6031	0.4691
	KOSPI	3.1972	0.2022	23.644	0.0000	22.422	0.0010	11.471	0.0749
	SHANGHAI	0.6151	0.7353	5.1603	0.1604	3.7174	0.7149	2.2576	0.8945
	TAIWGHT	0.7135	0.6999	3.9994	0.2615	7.8170	0.2518	21.732	0.0014

Note :
* Pairwise Granger Causality based on VEC
# Pairwise Granger Causality based on VAR

APPENDIX 1

Vector Autoregression Estimates for Series during the Asian Financial Crisis

	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
NYSEALL (-1)	0.011366	0.699078	1.112994	0.604743	0.408335	0.040601	0.483774	0.451074
	(0.06842)	(0.05738)	(0.19322)	(0.12162)	(0.23086)	(0.11614)	(0.11383)	(0.20851)
	[0.16611]	[12.1835]	[5.76039]	[4.97251]	[1.76872]	[0.34958]	[4.25001]	[2.16337]
NYSEALL (-2)	-0.042194	-0.140788	-0.415592	0.131641	-0.539864	0.016975	0.284318	0.014748
	(0.08641)	(0.07246)	(0.24401)	(0.15359)	(0.29155)	(0.14667)	(0.14375)	(0.26331)
	[-0.48830]	[-1.94291]	[-1.70321]	[0.85711]	[-1.85169]	[0.11574]	[1.97785]	[0.05601]
NYSEALL (-3)	-0.229835	-0.039029	0.091547	-0.106182	-0.699405	0.203629	0.020848	0.129059
	(0.08780)	(0.07363)	(0.24792)	(0.15605)	(0.29623)	(0.14903)	(0.14606)	(0.26754)
	[-2.61777]	[-0.53009]	[0.36926]	[-0.68042]	[-2.36100]	[1.36637]	[0.14273]	[0.48239]
AUSTOLD (-1)	0.005884	0.092928	-0.053304	-0.266667	-0.133558	-0.197899	0.150524	-0.168769
	(0.08427)	(0.07066)	(0.23795)	(0.14978)	(0.28432)	(0.14304)	(0.14019)	(0.25678)
	[0.06983]	[1.31506]	[-0.22401]	[-1.78043]	[-0.46974]	[-1.38357]	[1.07375]	[-0.65724]
AUSTOLD (-2)	0.015099	0.097542	-0.120055	0.095105	0.803696	0.124159	0.183320	0.045938
	(0.08500)	(0.07128)	(0.24002)	(0.15108)	(0.28679)	(0.14428)	(0.14140)	(0.25902)
	[0.17764]	[1.36844]	[-0.50018]	[0.62950]	[2.80236]	[0.86054]	[1.29642]	[0.17736]
AUSTOLD(-3)	0.005710	-0.167361	-0.018539	-0.126018	0.006168	-0.032043	-0.047827	-0.189501
	(0.07413)	(0.06216)	(0.20932)	(0.13176)	(0.25011)	(0.12583)	(0.12332)	(0.22589)
	[0.07703]	[-2.69229]	[-0.08856]	[-0.95644]	[0.02466]	[-0.25466]	[-0.38783]	[-0.83891]
HANGSENG (-1)	-0.017631	-0.028866	-0.042485	0.007902	-0.005717	0.098713	0.022347	0.092655
	(0.02743)	(0.02300)	(0.07746)	(0.04876)	(0.09255)	(0.04656)	(0.04563)	(0.08359)
	[-0.64274]	[-1.25489]	[-0.54849]	[0.16207]	[-0.06178]	[2.12008]	[0.48970]	[1.10848]
HANGSENG (-2)	0.135544	-0.022506	-0.040246	-0.011082	0.005999	-0.072808	-0.041811	-0.157790
	(0.02743)	(0.02300)	(0.07745)	(0.04875)	(0.09254)	(0.04655)	(0.04563)	(0.08357)
	[4.94214]	[-0.97855]	[-0.51967]	[-0.22734]	[0.06483]	[-1.56397]	[-0.91640]	[-1.88802]
HANGSENG (-3)	0.059538	0.105121	0.187652	-0.003523	0.143949	-0.054610	0.079982	0.090647
	(0.02782)	(0.02333)	(0.07857)	(0.04945)	(0.09388)	(0.04723)	(0.04629)	(0.08479)
	[2.13979]	[4.50526]	[2.38835]	[-0.07124]	[1.53334]	[-1.15628]	[1.72793]	[1.06911]
NIKKEI (-1)	-0.119729	-0.079212	-0.143815	-0.094670	0.283450	0.054091	-0.031609	0.007703
	(0.03949)	(0.03312)	(0.11151)	(0.07019)	(0.13324)	(0.06703)	(0.06570)	(0.12034)
	[-3.03180]	[-2.39192]	[-1.28965]	[-1.34873]	[2.12730]	[0.80694]	[-0.48113]	[0.06401]
NIKKEI (-2)	-0.006872	0.012489	0.025681	-0.121511	-0.214627	-0.000858	-0.150328	0.026942
	(0.04056)	(0.03402)	(0.11454)	(0.07210)	(0.13686)	(0.06885)	(0.06748)	(0.12361)
	[-0.16941]	[0.36716]	[0.22420]	[-1.68535]	[-1.56819]	[-0.01246]	[-2.22771]	[0.21796]
NIKKEI (-3)	0.016306	-0.062460	-0.024607	-0.020986	0.162380	-0.000341	-0.007128	0.104548
	(0.04084)	(0.03425)	(0.11534)	(0.07260)	(0.13781)	(0.06933)	(0.06795)	(0.12446)
	[0.39923]	[-1.82357]	[-0.21335]	[-0.28907]	[1.17829]	[-0.00492]	[-0.10490]	[0.83999]
KOSPI (-1)	0.010005	0.003295	0.079881	0.032074	0.140567	-0.009659	0.007223	0.235516
	(0.01952)	(0.01637)	(0.05512)	(0.03470)	(0.06586)	(0.03314)	(0.03248)	(0.05949)
	[0.51250]	[0.20126]	[1.44913]	[0.92440]	[2.13417]	[-0.29151]	[0.22241]	[3.95919]

KOSPI (-2)	-0.008803	-0.013958	-0.065160	0.045572	-0.089177	-0.035680	-0.024177	-0.070183
	(0.01952)	(0.01637)	(0.05513)	(0.03470)	(0.06587)	(0.03314)	(0.03248)	(0.05949)
	[-0.45092]	[-0.85256]	[-1.18194]	[1.31330]	[-1.35380]	[-1.07668]	[-0.74441]	[-1.17970]
KOSPI (-3)	-0.025105	-0.020656	-0.116681	-0.037291	-0.074784	0.008338	-0.073050	-0.137851
	(0.01934)	(0.01622)	(0.05462)	(0.03438)	(0.06527)	(0.03283)	(0.03218)	(0.05895)
	[-1.29783]	[-1.27338]	[-2.13608]	[-1.08460]	[-1.14580]	[0.25394]	[-2.27000]	[-2.33859]
SHANGHAI (-1)	-0.042446	0.008493	-0.300836	0.004649	0.057234	-0.032238	-0.000701	-0.205213
	(0.03895)	(0.03266)	(0.10997)	(0.06922)	(0.13140)	(0.06611)	(0.06479)	(0.11868)
	[-1.08988]	[0.26006]	[-2.73553]	[0.06717]	[0.43556]	[-0.48767]	[-0.01082]	[-1.72919]
SHANGHAI (-2)	0.064015	-0.011346	0.084812	0.109315	-0.261827	-0.048025	0.001993	0.010393
	(0.03921)	(0.03288)	(0.11072)	(0.06969)	(0.13230)	(0.06656)	(0.06523)	(0.11948)
	[1.63261]	[-0.34506]	[0.76599]	[1.56853]	[-1.97909]	[-0.72158]	[0.03056]	[0.08698]
SHANGHAI (-3)	-0.004951	-0.069682	-0.344192	-0.120452	0.085542	0.046282	-0.098103	-0.182422
	(0.03950)	(0.03313)	(0.11154)	(0.07021)	(0.13328)	(0.06705)	(0.06571)	(0.12037)
	[-0.12534]	[-2.10360]	[-3.08571]	[-1.71560]	[0.64183]	[0.69026]	[-1.49288]	[-1.51550]
TAIWGHT (-1)	-0.019151	0.007275	-0.112144	0.028332	0.251846	-0.083076	-0.075570	-0.174510
	(0.04025)	(0.03376)	(0.11367)	(0.07155)	(0.13582)	(0.06833)	(0.06697)	(0.12266)
	[-0.47575]	[0.21552]	[-0.98658]	[0.39599]	[1.85428]	[-1.21585]	[-1.12847]	[-1.42266]
TAIWGHT (-2)	-0.021538	-0.027507	0.002443	0.005453	0.200177	0.011044	0.078194	0.144559
	(0.04009)	(0.03362)	(0.11320)	(0.07125)	(0.13525)	(0.06804)	(0.06669)	(0.12215)
	[-0.53729]	[-0.81826]	[0.02158]	[0.07653]	[1.48001]	[0.16231]	[1.17254]	[1.18341]
TAIWGHT (-3)	0.004863	-0.025175	0.142302	0.077542	-0.315239	0.029283	0.018515	-0.056357
	(0.03827)	(0.03209)	(0.10806)	(0.06802)	(0.12911)	(0.06495)	(0.06366)	(0.11661)
	[0.12707]	[-0.78451]	[1.31691]	[1.14006]	[-2.44158]	[0.45083]	[0.29084]	[-0.48330]
JAKCOMP (-1)	0.060327	0.039985	0.187818	0.011488	0.052183	0.005055	0.027099	0.212343
	(0.02248)	(0.01885)	(0.06347)	(0.03995)	(0.07583)	(0.03815)	(0.03739)	(0.06849)
	[2.68409]	[2.12144]	[2.95930]	[0.28756]	[0.68812]	[0.13250]	[0.72477]	[3.10036]
JAKCOMP (-2)	-0.050003	0.000155	0.019630	0.002840	-0.143752	0.037499	0.051115	-0.025348
	(0.02318)	(0.01944)	(0.06546)	(0.04120)	(0.07821)	(0.03935)	(0.03856)	(0.07064)
	[-2.15709]	[0.00799]	[0.29989]	[0.06892]	[-1.83796]	[0.95303]	[1.32549]	[-0.35885]
JAKCOMP (-3)	-0.031183	-0.000785	-0.101237	0.042213	-0.011900	0.057283	-0.012955	-0.024935
	(0.02237)	(0.01876)	(0.06318)	(0.03977)	(0.07549)	(0.03798)	(0.03722)	(0.06818)
	[-1.39373]	[-0.04182]	[-1.60238]	[1.06149]	[-0.15764]	[1.50832]	[-0.34805]	[-0.36573]
C	0.001193	-0.000612	-0.002839	-0.001568	-0.002303	8.12E-05	-0.001585	-0.001744
	(0.00060)	(0.00050)	(0.00169)	(0.00107)	(0.00203)	(0.00102)	(0.00100)	(0.00183)
	[1.98742]	[-1.21635]	[-1.67535]	[-1.46981]	[-1.13734]	[0.07973]	[-1.58752]	[-0.95332]
R-squared	0.228531	0.540970	0.359659	0.199807	0.197333	0.078359	0.245015	0.235814
Adj. R-squared	0.150077	0.494289	0.294540	0.118431	0.115706	-0.015367	0.168237	0.158100
Sum sq. resides	0.019182	0.013489	0.152950	0.060598	0.218365	0.055266	0.053085	0.178115
S.E. equation	0.009015	0.007560	0.025458	0.016024	0.030418	0.015303	0.014998	0.027472
F-statistic	2.912916	11.58866	5.523073	2.455367	2.417494	0.836047	3.191203	3.034394
Log likelihood	871.7982	917.7454	600.8595	721.6829	554.3944	733.7032	738.9565	580.9816
Akaike AIC	-6.488875	-6.840961	-4.412716	-5.338566	-4.056662	-5.430676	-5.470931	-4.260396
Schwarz SC	-6.147446	-6.499532	-4.071287	-4.997137	-3.715233	-5.089246	-5.129502	-3.918967
Mean dependent	0.000859	-8.17E-05	-0.002207	-0.001010	-0.003514	0.000263	-0.000687	-0.001860
S.D. dependent	0.009779	0.010631	0.030310	0.017067	0.032347	0.015187	0.016445	0.029941
Determinant Residual Covariance		1.42E-29						

Log Likelihood (d.f. adjusted)	5706.024
Akaike Information Criteria	-42.19175
Schwarz Criteria	-39.46032

Sample: 7/01/1997 6/30/1998
Included observations: 261
Standard errors in ( ) & t-statistics in [ ]

APPENDIX 2

The Generalized Impulse Responses

Sample Period : January 1995 – June 1997

Response of NYSEALL:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.006194	0.000680	0.000560	7.67E-05	0.000470	-0.000237	9.84E-05	0.000410
2	0.006875	0.000872	0.000597	0.000394	0.000346	-0.000740	2.62E-05	0.001038
3	0.006773	0.000646	0.000736	0.000358	0.000750	-0.000852	-6.93E-05	0.000864
4	0.006593	0.000683	0.000903	0.000402	0.000899	-0.000758	-1.89E-05	0.000773
5	0.006599	0.000773	0.001026	0.000400	0.000920	-0.000740	1.44E-05	0.000810
6	0.006579	0.000865	0.001138	0.000420	0.000914	-0.000713	4.07E-05	0.000882
7	0.006552	0.000940	0.001247	0.000447	0.000926	-0.000681	6.50E-05	0.000937

Response of AUSTOLD:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.000638	0.005816	0.001216	0.000648	0.000315	-0.000344	0.000465	0.000890
2	0.003978	0.006249	0.001112	0.000699	0.000674	-0.000746	0.000495	0.001079
3	0.003468	0.006121	0.001034	0.000866	0.000758	-0.000639	0.000325	0.000975
4	0.003423	0.005812	0.000911	0.000776	0.001034	-0.000634	0.000259	0.000635
5	0.003345	0.005761	0.000798	0.000742	0.001022	-0.000627	0.000245	0.000531
6	0.003415	0.005690	0.000682	0.000692	0.000989	-0.000686	0.000220	0.000491
7	0.003426	0.005627	0.000584	0.000673	0.000958	-0.000720	0.000198	0.000459

Response of HANGSENG:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.000911	0.002107	0.010077	0.001608	0.000206	-0.000278	0.001364	0.002669
2	0.006252	0.002209	0.010315	0.001046	0.000347	-0.000100	0.001140	0.003606
3	0.006406	0.003178	0.010748	0.000818	0.000304	-0.000656	0.000958	0.003838
4	0.007112	0.002865	0.010453	0.000656	0.000701	-0.000908	0.000832	0.003353
5	0.007000	0.002654	0.010112	0.000591	0.000717	-0.001001	0.000739	0.003035
6	0.007126	0.002365	0.009741	0.000461	0.000713	-0.001138	0.000646	0.002795
7	0.007167	0.002141	0.009408	0.000383	0.000647	-0.001243	0.000571	0.002641

Response of NIKKEI:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.000150	0.001349	0.001932	0.012102	-0.000129	-4.73E-06	0.000679	0.001088
2	0.002996	0.000612	0.001302	0.011023	0.000318	6.24E-05	0.000247	0.001273
3	0.003838	0.000709	0.001432	0.010997	0.000712	0.000451	-0.000103	0.001363
4	0.004240	0.000419	0.001171	0.010953	0.000889	0.000180	-0.000163	0.001193
5	0.004156	0.000253	0.000937	0.010849	0.000923	7.49E-05	-0.000254	0.000986
6	0.004263	5.63E-05	0.000686	0.010765	0.000924	-1.84E-05	-0.000309	0.000820
7	0.004304	-0.000102	0.000448	0.010708	0.000877	-0.000102	-0.000363	0.000710

Response of KOSPI:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.000915	0.000653	0.000246	-0.000128	0.012065	0.000892	0.000311	-0.000517
2	0.002025	0.000816	0.000541	0.000404	0.013789	0.000977	0.000944	-0.000629
3	0.001968	0.000843	0.001005	-0.000238	0.013975	0.000618	0.000988	-0.000456
4	0.002128	0.000813	0.001100	-0.000362	0.014041	0.000585	0.001000	-0.000439
5	0.002102	0.000854	0.001120	-0.000379	0.014011	0.000514	0.001017	-0.000440
6	0.002136	0.000844	0.001097	-0.000402	0.014013	0.000488	0.001010	-0.000466
7	0.002144	0.000827	0.001067	-0.000407	0.014007	0.000478	0.001004	-0.000483

Response of SHANGHAI:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	-0.001040	-0.001606	-0.000751	-1.06E-05	0.002011	0.027196	0.001054	-0.000121

2	-0.000706	-0.001336	-4.50E-05	0.001748	0.003266	0.028184	0.001252	0.000922
3	-0.001951	-0.000795	-0.000399	0.001230	0.003352	0.028708	0.001290	0.001419
4	-0.001598	-0.000739	-0.000386	0.001066	0.003543	0.028771	0.001261	0.001297
5	-0.001478	-0.000847	-0.000657	0.001026	0.003472	0.028725	0.001238	0.001202
6	-0.001378	-0.001052	-0.000966	0.000921	0.003448	0.028612	0.001150	0.001037
7	-0.001305	-0.001267	-0.001275	0.000846	0.003415	0.028519	0.001079	0.000878

Response of TAIWGHT:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.000211	0.001059	0.001794	0.000743	0.000341	0.000514	0.013256	0.000820
2	0.001042	0.001272	0.001521	0.001165	0.001212	0.000533	0.012699	0.001241
3	0.001809	0.000487	0.000952	0.000825	0.001339	0.000449	0.013279	0.001794
4	0.001701	0.000178	0.000639	0.000728	0.001352	0.000277	0.013090	0.001729
5	0.001954	-0.000182	0.000211	0.000561	0.001375	9.44E-05	0.013051	0.001509
6	0.002086	-0.000467	-0.000232	0.000443	0.001309	-6.92E-05	0.012942	0.001298
7	0.002232	-0.000782	-0.000676	0.000324	0.001254	-0.000232	0.012841	0.001087

Response of JAKCOMP:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.000535	0.001239	0.002144	0.000727	-0.000347	-3.60E-05	0.000501	0.008094
2	0.002856	0.001532	0.003201	0.000773	-0.000652	-0.000256	0.000439	0.010481
3	0.002884	0.002284	0.004268	0.000874	-0.000343	-0.000227	0.000634	0.010930
4	0.003482	0.002454	0.004509	0.000835	4.21E-05	-0.000223	0.000662	0.010778
5	0.003574	0.002533	0.004510	0.000792	0.000113	-0.000249	0.000650	0.010694
6	0.003652	0.002469	0.004423	0.000736	0.000149	-0.000300	0.000615	0.010604
7	0.003648	0.002405	0.004330	0.000711	0.000142	-0.000330	0.000592	0.010542

Sample Period : July 1997 – June 1998

Response of NYSEALL:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.009015	0.000751	0.001817	0.001177	0.001911	-0.001207	-0.000278	3.91E-05
2	-6.72E-05	-0.000461	-0.000595	-0.001735	0.000234	-0.000751	-0.000356	0.001179
3	-0.000349	0.001535	0.003053	0.000931	4.37E-05	0.001363	0.000326	-5.12E-05
4	-0.000649	0.000245	0.000954	0.000552	-0.001107	-0.000488	0.000294	-0.000215
5	-0.000404	-0.000229	-0.000614	-0.000126	-0.000563	5.09E-05	-0.000570	-0.000215
6	7.58E-05	-0.000336	4.15E-05	-0.000128	-0.000166	-0.000291	0.000233	-4.50E-05
7	0.000202	-0.000108	-0.000106	-9.08E-05	0.000153	-0.000368	0.000169	-6.43E-05

Response of AUSTOLD:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.000630	0.007560	0.003100	0.002471	0.000959	0.000219	3.26E-05	0.001269
2	0.006053	0.000713	0.000810	-0.000237	0.001462	-0.000790	-0.000239	0.000787
3	-0.001248	0.000371	-0.000783	-0.000959	-0.000293	-0.000550	-0.000800	0.000992
4	6.92E-05	0.000502	0.003620	0.000209	-0.000905	3.80E-05	0.000405	0.000170
5	-0.000938	-4.40E-05	4.58E-05	0.000166	-0.000897	-0.000778	-0.000322	-1.33E-05
6	-0.000500	-0.000674	-0.000482	-5.39E-05	-0.000346	0.000355	-0.000360	-8.96E-05
7	-4.25E-05	-0.000168	8.92E-06	0.000143	-7.05E-05	-0.000552	0.000456	-0.000425

Response of HANGSENG:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.005130	0.010439	0.025458	0.008067	0.001481	0.002055	0.005885	0.008047
2	0.010688	0.000271	0.001057	-0.000520	0.004295	-0.006243	-0.001656	0.004461
3	-0.005363	-0.001598	-0.002390	-0.001987	-0.001303	0.000712	-3.16E-05	0.002211
4	0.000276	0.002439	0.007469	0.002960	-0.003450	-0.003066	0.003519	-0.002431
5	0.000151	-0.000370	-0.001651	-0.000747	-0.002327	-0.001723	-0.001302	-0.001090
6	-0.000200	-0.001200	-0.001342	-0.000867	-4.39E-05	0.001494	-0.001151	0.000378
7	0.000103	-3.28E-05	0.001584	0.000217	9.06E-05	-0.001403	0.001428	-0.000404

Response of NIKKEI:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.002092	0.005237	0.005077	0.016024	0.000665	-0.000196	0.001430	0.002927
2	0.005312	-0.001794	0.000253	-0.001265	0.001867	-0.000697	0.000275	-0.000150
3	-0.000706	0.000125	-0.000487	-0.002236	0.001554	0.001256	-0.000167	0.000454
4	-0.000798	2.09E-05	0.002031	0.000641	-0.001291	-0.001195	0.001771	0.001200
5	-0.001139	0.000741	-0.000150	0.000520	-0.000901	-0.000480	-0.000235	-0.000342
6	0.000726	-0.000343	-0.000268	-9.57E-05	-0.000110	0.000594	-0.000453	-0.000125
7	5.81E-05	-0.000254	-0.000192	-0.000146	-0.000179	-0.000705	0.000118	-3.22E-05

Response of KOSPI:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.006448	0.003860	0.001769	0.001262	0.030418	0.000114	0.002564	0.000629
2	0.004839	0.001547	0.003267	0.005412	0.005459	0.000208	0.004540	0.002517
3	-0.002091	0.003441	0.000475	-0.002486	-0.001078	-0.003655	0.002537	-0.001800
4	-0.002348	0.003872	0.002899	0.001317	-0.003826	0.002897	-0.003309	-0.000150
5	-1.03E-05	-0.000301	0.000189	0.000212	-0.002408	-0.001483	-0.000908	0.000675
6	-0.001125	-0.001167	-0.000434	-0.000747	-0.000567	-0.000485	-0.001122	5.03E-05
7	0.000482	-0.001044	1.61E-05	-0.000249	0.000796	-0.000371	0.000664	2.32E-05

Response of SHANGHAI:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	-0.002049	0.000443	0.001235	-0.000187	5.73E-05	0.015303	-0.000107	-0.000729
2	0.000904	-0.000186	0.001947	0.001130	-0.000328	-0.000392	-0.000612	0.000725
3	-0.000559	-0.000171	-0.001485	-0.000383	-0.000868	-0.001424	-0.000295	0.000863
4	0.001008	-0.000467	-0.000411	1.15E-05	0.000623	0.000939	0.000258	0.000919
5	9.87E-05	8.76E-05	0.000186	0.000301	0.000344	-0.000379	0.000243	0.000124
6	0.000405	0.000109	0.000189	-5.67E-05	8.78E-05	6.92E-05	5.82E-05	-7.58E-05
7	-0.000194	4.32E-05	-3.48E-05	2.48E-05	-0.000225	0.000149	-0.000110	0.000117

Response of TAIWGHT:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	-0.000462	6.46E-05	0.003467	0.001339	0.001264	-0.000105	0.014998	0.001616
2	0.004591	0.001717	0.001739	0.000659	0.001221	-0.000536	-0.001078	0.000925
3	0.002773	0.000403	-0.000217	-0.002428	0.000481	-0.001066	0.000563	0.001897
4	2.56E-05	0.001234	0.003021	0.000525	-0.001982	-0.001031	0.000225	0.000944
5	5.13E-05	0.000530	0.001269	0.000151	-0.001011	-0.000630	-0.000160	-1.97E-05
6	-0.000501	-0.000419	0.000268	8.26E-05	-0.000843	0.000349	-0.000633	-5.84E-05
7	-0.000107	-0.000419	0.000212	-4.17E-05	-0.000332	-0.000648	0.000346	-0.000316

Response of JAKCOMP:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.000119	0.004613	0.008684	0.005018	0.000568	-0.001309	0.002960	0.027472
2	0.006497	0.001857	0.004096	0.002152	0.007895	-0.003766	-0.000938	0.006421
3	0.000377	-0.001342	-0.002910	-0.000150	0.000978	-0.001534	0.001931	0.000811
4	-0.001092	0.000425	0.002532	0.001699	-0.004979	-0.001807	0.000431	-0.001524
5	-0.000868	0.000598	0.000557	-0.000285	-0.002692	-0.000610	-0.001108	-0.001257
6	-0.000244	-0.001082	-0.000749	-0.000299	-0.000431	0.001187	-0.001227	0.000304
7	-0.000269	-0.000818	-0.000197	-0.000106	0.000501	-0.000678	0.000728	-4.40E-05

Sample Period : July 1998 – June 2007

Response of NYSEALL:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.009913	0.001281	0.001441	0.001472	0.001103	8.22E-05	0.001055	0.000474
2	0.010142	0.001285	0.001508	0.001223	0.001225	0.000312	0.001368	0.000543
3	0.009934	0.001460	0.001411	0.001186	0.000780	0.000417	0.001315	0.000525
4	0.009776	0.001435	0.001397	0.001236	0.000868	0.000106	0.000988	0.000801
5	0.009678	0.001441	0.001777	0.001193	0.001009	5.71E-05	0.001210	0.000787

6	0.009509	0.001357	0.001264	0.001161	0.000686	-0.000267	0.001513	0.000392
7	0.009110	0.001122	0.001435	0.001232	0.000543	-3.64E-05	0.001347	0.000536

Response of AUSTOLD:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.000775	0.005997	0.002133	0.002108	0.001767	0.000502	0.001061	0.001089
2	0.004666	0.005539	0.002449	0.001996	0.001753	0.000544	0.001041	0.000945
3	0.004816	0.005245	0.002064	0.001734	0.001482	0.000418	0.000999	0.000715
4	0.005109	0.005609	0.002156	0.001858	0.001606	0.000301	0.001005	0.000735
5	0.005213	0.005366	0.001985	0.001736	0.001483	0.000186	0.000804	0.000728
6	0.005245	0.005275	0.002027	0.001900	0.001613	3.71E-05	0.000993	0.000715
7	0.005142	0.005247	0.002042	0.001959	0.001547	-0.000162	0.001151	0.000537

Response of HANGSENG:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.001867	0.004570	0.012845	0.004858	0.005439	0.001400	0.003295	0.003351
2	0.007495	0.004577	0.013076	0.004412	0.005788	0.001135	0.003321	0.003413
3	0.008101	0.004422	0.012620	0.003795	0.005273	0.001194	0.003440	0.003212
4	0.008726	0.005133	0.012822	0.003858	0.005183	0.001344	0.003776	0.003213
5	0.009249	0.005075	0.012839	0.004310	0.005600	0.001599	0.003933	0.003219
6	0.009058	0.004791	0.012211	0.004012	0.005680	0.001186	0.003842	0.002894
7	0.008526	0.004881	0.012374	0.004086	0.005082	0.000620	0.003911	0.002663

Response of NIKKEI:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.001887	0.004466	0.004804	0.012704	0.004716	0.000821	0.003076	0.002131
2	0.006714	0.004737	0.005146	0.012050	0.005057	0.000396	0.003397	0.002066
3	0.006848	0.004054	0.004970	0.011648	0.004590	0.000206	0.003100	0.002035
4	0.006968	0.004435	0.005019	0.011491	0.004604	0.000539	0.003166	0.001829
5	0.007301	0.004372	0.004851	0.011146	0.004447	0.000860	0.003119	0.001316
6	0.007532	0.004168	0.004649	0.011285	0.004634	0.000843	0.003104	0.001177
7	0.007465	0.003953	0.004509	0.011079	0.004281	0.000415	0.003452	0.001039

Response of KOSPI:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.002032	0.005384	0.007735	0.006782	0.018267	0.000179	0.005534	0.004029
2	0.008068	0.005292	0.008752	0.006738	0.018631	0.000139	0.005892	0.004714
3	0.008797	0.005878	0.008989	0.006352	0.017859	3.08E-05	0.005741	0.004647
4	0.009658	0.006626	0.009593	0.006636	0.017575	0.000310	0.006284	0.004532
5	0.010595	0.006195	0.009585	0.006516	0.017498	0.000375	0.005441	0.004359
6	0.010018	0.005828	0.009647	0.006288	0.016501	0.000631	0.005778	0.004349
7	0.010403	0.005975	0.009825	0.006632	0.016318	0.000203	0.006284	0.004271

Response of SHANGHAI:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.000119	0.001199	0.001561	0.000926	0.000140	0.014326	0.000725	0.000765
2	0.000333	0.001723	0.001938	0.001133	0.000497	0.014441	0.001099	0.000959
3	0.000636	0.001802	0.002072	0.000951	0.000375	0.014071	0.001492	0.001227
4	0.000195	0.001805	0.002656	0.000987	0.000532	0.014744	0.001796	0.001616
5	0.000608	0.002163	0.002984	0.001572	0.000637	0.015256	0.002020	0.001515
6	0.001119	0.002474	0.003443	0.001786	0.000562	0.015056	0.002170	0.001500
7	0.001853	0.002326	0.003295	0.001856	0.000253	0.014521	0.002480	0.001365

Response of TAIWGHT:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.001586	0.002636	0.003822	0.003607	0.004513	0.000754	0.014898	0.002374
2	0.005268	0.003174	0.005495	0.004993	0.005843	0.000744	0.015216	0.002691
3	0.006039	0.003387	0.005956	0.005249	0.005983	0.000866	0.015601	0.002194
4	0.006639	0.003345	0.005862	0.005231	0.005509	0.000714	0.016012	0.001334
5	0.007215	0.003089	0.005616	0.004998	0.005306	0.001228	0.014750	0.000941
6	0.007731	0.003545	0.005899	0.004983	0.006094	0.000882	0.015266	0.000796
7	0.008103	0.003483	0.005756	0.005052	0.006131	0.000680	0.015022	0.001267

Response of JAKCOMP:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP

1	0.000700	0.002659	0.003819	0.002456	0.003229	0.000781	0.002333	0.014641
2	0.004149	0.002906	0.005076	0.002463	0.004424	0.001173	0.002800	0.016557
3	0.004291	0.002259	0.004906	0.002314	0.004806	0.001086	0.002904	0.016610
4	0.005131	0.002910	0.004657	0.002667	0.005076	0.000702	0.003195	0.016533
5	0.006106	0.003086	0.004907	0.003453	0.005835	0.000569	0.003494	0.016410
6	0.006487	0.002786	0.005040	0.003615	0.006893	0.000168	0.003227	0.016336
7	0.006831	0.002851	0.004658	0.003223	0.006477	3.06E-05	0.003590	0.015807

Sample Period : July 2007 – May 2009

Response of NYSEALL:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.022384	0.006687	0.008853	0.007134	0.007739	0.002501	0.005077	0.006164
2	0.018882	0.004773	0.007497	0.006242	0.007564	0.001375	0.005150	0.006884
3	0.015740	0.002521	0.005964	0.003171	0.005064	0.001453	0.004760	0.006942
4	0.017316	0.003845	0.006504	0.005176	0.004804	0.002271	0.003596	0.006009
5	0.016334	0.005277	0.006857	0.003985	0.005327	0.001686	0.004940	0.006476
6	0.014606	0.004437	0.006466	0.003156	0.002989	-4.26E-05	0.002765	0.004973
7	0.013767	0.003496	0.005061	0.001856	0.002467	0.000167	0.003115	0.004411

Response of AUSTOLD:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.003661	0.012255	0.006833	0.005976	0.006429	0.002711	0.005288	0.005144
2	0.014180	0.011604	0.008347	0.006149	0.007340	0.001808	0.005343	0.008009
3	0.013016	0.010074	0.007988	0.005492	0.006659	0.002007	0.006038	0.008438
4	0.013207	0.007743	0.006563	0.003813	0.005820	0.001810	0.005506	0.007832
5	0.013927	0.008693	0.006193	0.004493	0.004973	0.001528	0.004828	0.007749
6	0.014257	0.010417	0.007488	0.005363	0.005042	-0.000180	0.004524	0.007105
7	0.013280	0.010322	0.007112	0.004798	0.005522	2.53E-05	0.004333	0.006961

Response of HANGSENG:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.009312	0.013128	0.023547	0.012679	0.014815	0.011686	0.012032	0.012687
2	0.020806	0.010848	0.020791	0.010433	0.015340	0.006980	0.009626	0.013771
3	0.019724	0.009184	0.020367	0.008159	0.014237	0.007775	0.010237	0.014223
4	0.020123	0.008170	0.018991	0.007337	0.013084	0.008346	0.009212	0.013016
5	0.019002	0.008113	0.018836	0.006294	0.010585	0.007898	0.009273	0.012790
6	0.017886	0.009225	0.018278	0.005273	0.009728	0.006091	0.008278	0.011813
7	0.017386	0.010708	0.018307	0.004821	0.010138	0.005722	0.009609	0.011707

Response of NIKKEI:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.005562	0.008509	0.009396	0.017451	0.010914	0.004197	0.007958	0.006340
2	0.019454	0.009195	0.011940	0.016427	0.012890	0.002831	0.007848	0.009529
3	0.017842	0.007437	0.011633	0.013738	0.011734	0.004207	0.008007	0.010640
4	0.016005	0.005048	0.009394	0.010841	0.010063	0.003833	0.007447	0.010048
5	0.016256	0.005969	0.009403	0.011960	0.007902	0.003738	0.006405	0.009309
6	0.016469	0.007834	0.010855	0.012387	0.008382	0.002815	0.007322	0.009990
7	0.014839	0.008518	0.010320	0.011207	0.008354	0.001682	0.006044	0.008397

Response of KOSPI:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.006452	0.009790	0.011741	0.011671	0.018661	0.006404	0.011806	0.008802
2	0.014637	0.009285	0.011978	0.009306	0.018417	0.004653	0.010324	0.010726
3	0.014008	0.007829	0.013176	0.008489	0.017492	0.007292	0.010643	0.011220
4	0.014796	0.006942	0.012316	0.007660	0.018107	0.006748	0.010657	0.010015
5	0.013223	0.007705	0.011880	0.006808	0.016653	0.006146	0.009907	0.009208
6	0.013315	0.010130	0.011989	0.006978	0.015589	0.005247	0.010117	0.008881
7	0.012683	0.009921	0.012152	0.006713	0.015670	0.005325	0.009754	0.008400

Response of SHANGHAI:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.002637	0.005221	0.011712	0.005676	0.008099	0.023601	0.007620	0.005587
2	0.008637	0.005245	0.012858	0.004652	0.009057	0.022849	0.007364	0.008367
3	0.009284	0.004039	0.013341	0.004868	0.008924	0.022393	0.007009	0.007331
4	0.008986	0.004159	0.013077	0.004708	0.009486	0.023241	0.007091	0.006903
5	0.011457	0.005602	0.015394	0.006017	0.010888	0.024599	0.007295	0.009430
6	0.012386	0.006312	0.014810	0.004095	0.010950	0.022813	0.006349	0.009355
7	0.014401	0.007677	0.015555	0.004448	0.012856	0.022736	0.007107	0.010767

Response of TAIWGHT:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.003868	0.007358	0.008714	0.007776	0.010789	0.005505	0.017052	0.007624
2	0.012108	0.008017	0.011713	0.008173	0.012124	0.005525	0.016693	0.011231
3	0.012101	0.007578	0.011789	0.008268	0.011897	0.006583	0.017679	0.011977
4	0.013192	0.006784	0.011408	0.007367	0.012218	0.007314	0.017099	0.012013
5	0.012923	0.006812	0.010444	0.005867	0.010239	0.006358	0.016244	0.011008
6	0.012044	0.008241	0.010242	0.005345	0.008772	0.006134	0.015125	0.010044
7	0.010696	0.007552	0.010154	0.004398	0.007923	0.006497	0.014530	0.009059

Response of JAKCOMP:

Period	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.005185	0.007904	0.010145	0.006840	0.008881	0.004458	0.008418	0.018829
2	0.013321	0.007727	0.012011	0.007101	0.010295	0.004685	0.007378	0.022031
3	0.015117	0.007654	0.012949	0.007914	0.012176	0.006111	0.008245	0.023570
4	0.016980	0.008304	0.014501	0.008773	0.013696	0.007119	0.009529	0.023374
5	0.016984	0.008458	0.013280	0.008752	0.012157	0.006788	0.009467	0.022788
6	0.017393	0.009726	0.013428	0.008452	0.013030	0.006716	0.009443	0.021935
7	0.015503	0.009287	0.013205	0.007345	0.012239	0.006572	0.010511	0.020434

APPENDIX 3

The Forecast Error Variance Decomposition

Sample Period : January 1995 – June 1997

Variance Decomposition of NYSEALL:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.006194	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.009292	99.17938	0.016098	0.002844	0.109948	0.035834	0.247278	0.006124	0.402492
3	0.011532	98.89153	0.017688	0.018190	0.125636	0.068747	0.451267	0.027134	0.399809
4	0.013312	98.73854	0.014235	0.072676	0.139948	0.144992	0.504388	0.033923	0.351297
5	0.014885	98.62542	0.012463	0.141553	0.141849	0.196242	0.524423	0.036266	0.321785
6	0.016302	98.51518	0.018154	0.222759	0.142410	0.227675	0.525292	0.037192	0.311339
7	0.017599	98.39184	0.031472	0.317518	0.143781	0.252906	0.515636	0.037464	0.309380

Variance Decomposition of AUSTOLD:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.005816	1.204985	98.79501	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.009173	19.29139	80.36502	0.220173	0.004704	0.013354	0.098454	0.001302	0.005603
3	0.011397	21.75313	77.72873	0.297194	0.051206	0.051569	0.099539	0.014884	0.003749
4	0.013125	23.20409	75.97630	0.373204	0.062255	0.202118	0.112195	0.028450	0.041389
5	0.014622	23.93167	74.99544	0.472935	0.066597	0.292598	0.120359	0.036226	0.084167
6	0.015971	24.63076	74.06983	0.597171	0.065913	0.339972	0.139103	0.041896	0.115349
7	0.017201	25.20161	73.28766	0.733145	0.065503	0.365663	0.161046	0.046634	0.138747

Variance Decomposition of HANGSENG:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.010077	0.816499	4.016338	95.16716	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.015420	16.78499	2.702666	80.04008	0.133267	0.026477	0.060823	0.026146	0.225556
3	0.019626	21.01632	3.278370	74.92495	0.310182	0.049551	0.040392	0.082279	0.297961
4	0.023119	24.60841	3.184967	71.33105	0.420318	0.035714	0.056870	0.120012	0.242658
5	0.025996	26.71392	3.051684	69.29037	0.488006	0.028478	0.082158	0.149171	0.196214
6	0.028496	28.48382	2.852033	67.63347	0.549329	0.023906	0.121153	0.172783	0.163511
7	0.030711	29.97055	2.652254	66.25685	0.598855	0.020612	0.167365	0.192711	0.140800

Variance Decomposition of NIKKEI:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.012102	0.015319	1.226750	1.951982	96.80595	0.000000	0.000000	0.000000	0.000000
2	0.016663	3.241498	0.676302	1.389189	94.57807	0.025835	0.003258	0.031339	0.054513
3	0.020363	5.721809	0.473078	1.197751	92.22420	0.103544	0.060752	0.136941	0.081928
4	0.023555	7.517018	0.353961	1.015597	90.60567	0.181960	0.052662	0.189733	0.083398
5	0.026322	8.513217	0.289498	0.868451	89.73962	0.240441	0.043031	0.231875	0.073865
6	0.028826	9.285180	0.262027	0.742794	89.06903	0.280072	0.035970	0.261288	0.063642
7	0.031131	9.872719	0.259173	0.640172	88.55486	0.301376	0.032275	0.284015	0.055410

Variance Decomposition of KOSPI:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.012065	0.574716	0.212443	0.001950	0.030924	99.17997	0.000000	0.000000	0.000000
2	0.018366	1.463571	0.197504	0.018544	0.037124	98.18485	4.29E-06	0.088375	0.010030
3	0.023116	1.648911	0.199156	0.108190	0.059580	97.83581	0.025241	0.115722	0.007388
4	0.027089	1.818012	0.191248	0.168256	0.088565	97.55875	0.040098	0.128929	0.006139
5	0.030537	1.904639	0.192719	0.205345	0.108222	97.38997	0.054825	0.138687	0.005597
6	0.033635	1.973245	0.192060	0.225890	0.122923	97.26890	0.066540	0.144863	0.005577
7	0.036468	2.024065	0.189979	0.237063	0.133174	97.18533	0.075544	0.149125	0.005719

Variance Decomposition of SHANGHAI:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.027196	0.146340	0.304698	0.017985	0.006727	0.638859	98.88539	0.000000	0.000000
2	0.039236	0.102670	0.250539	0.013711	0.234836	1.068244	98.28161	3.16E-05	0.048358
3	0.048687	0.227281	0.177094	0.009400	0.230035	1.230035	98.00205	3.99E-05	0.124061

4	0.056607	0.247840	0.141050	0.007492	0.214103	1.343462	97.89738	3.55E-05	0.148641
5	0.063521	0.250983	0.123776	0.009826	0.205432	1.397680	97.85097	2.94E-05	0.161300
6	0.069702	0.247519	0.119700	0.017580	0.197913	1.432351	97.81891	3.75E-05	0.165987
7	0.075341	0.241841	0.124958	0.031076	0.192265	1.454962	97.78825	6.09E-05	0.166586

Variance Decomposition of TAIWGHT:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.013256	0.025221	0.617792	1.466435	0.094518	0.044114	0.190557	97.56136	0.000000
2	0.018411	0.333475	0.720364	1.201456	0.270132	0.375563	0.192175	96.83364	0.073195
3	0.022842	0.843635	0.484180	0.887863	0.263187	0.521102	0.162789	96.47775	0.359492
4	0.026467	1.041613	0.360648	0.696914	0.256153	0.606972	0.129819	96.38728	0.520604
5	0.029681	1.261821	0.304849	0.555731	0.241037	0.662730	0.103442	96.28070	0.589693
6	0.032576	1.457554	0.299219	0.469140	0.227939	0.685615	0.087538	96.15644	0.616554
7	0.035247	1.646082	0.341487	0.438839	0.216112	0.692036	0.082571	95.96216	0.620713

Variance Decomposition of JAKCOMP:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.008094	0.437474	2.152389	5.533751	0.164787	0.304879	0.018193	0.041379	91.34715
2	0.013435	4.676810	1.614536	6.244318	0.086459	0.597803	0.007164	0.015418	86.75749
3	0.017505	5.468665	2.229427	8.147456	0.054398	0.498452	0.007185	0.009105	83.58531
4	0.020807	6.671306	2.581391	9.228963	0.038597	0.378900	0.007595	0.006587	81.08666
5	0.023629	7.459908	2.832717	9.810219	0.030081	0.307463	0.007077	0.005385	79.54715
6	0.026118	8.060609	2.953230	10.11134	0.025285	0.260310	0.005884	0.004884	78.57846
7	0.028362	8.489874	3.009740	10.26385	0.022126	0.228299	0.005001	0.004646	77.97647

Sample Period : July 1997 – June 1998

Variance Decomposition of NYSEALL:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.009015	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.009352	92.93434	0.238949	0.228985	3.027967	0.080326	0.664825	0.060774	2.763829
3	0.010005	81.31789	2.670598	7.995783	2.647089	0.071243	1.540349	0.217668	3.539380
4	0.010189	78.82303	2.661821	8.829203	2.685959	1.017402	1.913225	0.212169	3.857188
5	0.010232	78.31373	2.676102	9.001085	2.670912	1.233334	1.902532	0.377053	3.825254
6	0.010247	78.08793	2.780301	9.005478	2.667366	1.249408	1.975436	0.416317	3.817762
7	0.010259	77.94987	2.788965	8.996283	2.665007	1.260961	2.078440	0.449391	3.811078

Variance Decomposition of AUSTOLD:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.007560	0.694231	99.30577	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.009818	38.41590	58.93001	0.313060	1.203292	0.016286	0.001191	0.018591	1.101671
3	0.010101	37.81964	55.89537	0.927410	1.874529	0.030409	0.462177	0.411088	2.579373
4	0.010927	32.32238	47.97286	12.90776	2.031794	0.695508	0.503893	0.564040	3.001764
5	0.011043	32.36897	46.97212	12.68822	2.041433	1.095789	1.180726	0.689780	2.962958
6	0.011088	32.30768	46.91468	12.60169	2.079629	1.112044	1.269224	0.770880	2.944175
7	0.011127	32.08666	46.61352	12.52174	2.097374	1.105579	1.516386	0.909073	3.149666

Variance Decomposition of HANGSENG:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.025458	4.060832	15.57397	80.36520	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.028640	17.13373	12.35228	63.60706	0.341836	0.538970	2.905598	0.264076	2.856448
3	0.029337	19.67144	11.92743	60.72654	0.401820	0.514510	2.770852	0.253254	3.734163
4	0.031329	17.25678	11.05757	58.53346	0.434357	1.803805	3.889370	0.582751	6.441915
5	0.031524	17.04695	10.93646	58.10702	0.441941	2.384718	4.058890	0.620763	6.403257
6	0.031635	16.93172	11.00085	57.78684	0.448963	2.368988	4.293953	0.692481	6.476208
7	0.031758	16.80177	10.91591	57.64745	0.446860	2.352329	4.514968	0.774268	6.546447

Variance Decomposition of NIKKEI:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP

1	0.016024	1.703637	10.05038	3.406071	84.83991	0.000000	0.000000	0.000000	0.000000
2	0.017122	11.11775	10.52167	2.985250	74.94795	0.338434	0.000248	0.058803	0.029899
3	0.017436	10.88500	10.15766	2.950265	74.01219	1.255347	0.399286	0.059440	0.280814
4	0.017766	10.68555	9.785623	4.676558	71.31160	1.581479	1.130050	0.514300	0.314847
5	0.017867	10.97183	9.896299	4.648645	70.58662	1.752029	1.233562	0.518542	0.392477
6	0.017909	11.08457	9.901071	4.651812	70.25523	1.761051	1.406072	0.546516	0.393676
7	0.017926	11.06476	9.903463	4.647019	70.12391	1.767017	1.548378	0.552477	0.392974

Variance Decomposition of KOSPI:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.030418	4.492974	1.201581	0.096192	0.027263	94.18199	0.000000	0.000000	0.000000
2	0.031779	6.435486	1.231219	0.504903	1.928104	88.36456	0.034604	1.322035	0.179094
3	0.032758	6.464056	2.385346	0.508389	2.977075	83.28386	1.639209	1.994181	0.747888
4	0.033668	6.605930	3.728012	0.821997	2.818475	80.13680	2.049141	3.024416	0.815224
5	0.033806	6.551936	3.705483	0.825766	2.801602	79.99814	2.215519	3.063898	0.837655
6	0.033875	6.635730	3.791601	0.827585	2.799723	79.67788	2.241125	3.188841	0.837512
7	0.033914	6.640538	3.885645	0.838786	2.793394	79.55615	2.245740	3.203940	0.835807

Variance Decomposition of SHANGHAI:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.015303	1.793138	0.162096	1.049052	0.082243	0.098236	96.81523	0.000000	0.000000
2	0.015550	2.074283	0.185315	2.811583	0.325582	0.170191	93.84144	0.584583	0.007019
3	0.015760	2.145136	0.186665	3.614439	0.316962	0.426995	92.07794	0.573721	0.658141
4	0.015914	2.504861	0.303960	3.621784	0.319572	0.507179	90.82475	0.631651	1.286245
5	0.015927	2.504823	0.305990	3.625125	0.344714	0.550079	90.74540	0.639591	1.284277
6	0.015934	2.567206	0.307936	3.624809	0.354760	0.549599	90.66811	0.640568	1.287016
7	0.015938	2.580720	0.309178	3.623200	0.355159	0.564545	90.63027	0.643485	1.293446

Variance Decomposition of TAIWGHT:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.014998	0.095076	0.004760	6.852547	0.215868	1.039631	0.165679	91.62644	0.000000
2	0.015804	8.524715	0.722129	6.212289	0.279082	0.940830	0.149469	82.97618	0.195305
3	0.016563	10.56349	0.668307	5.978628	3.320036	0.872393	0.311251	75.95810	2.327794
4	0.017039	9.981396	1.157873	8.388835	3.198880	2.349392	0.906774	71.81448	2.202370
5	0.017151	9.852127	1.237315	8.746375	3.180131	2.714912	1.086362	70.93089	2.251888
6	0.017207	9.873514	1.277837	8.803114	3.170052	2.860845	1.103867	70.66806	2.242711
7	0.017241	9.837803	1.329745	8.833619	3.157528	2.871701	1.261091	70.40385	2.304663

Variance Decomposition of JAKCOMP:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.027472	0.001877	2.826669	7.706248	0.708729	0.013650	0.664707	0.071727	88.00639
2	0.029950	4.707069	2.572607	7.196304	0.619394	4.949460	1.893140	0.675527	77.38650
3	0.030314	4.610130	2.717778	7.832193	0.674867	4.941717	1.998462	1.388526	75.83633
4	0.031076	4.510484	2.613969	8.289441	0.804504	7.126580	2.363523	1.321296	72.97020
5	0.031283	4.528002	2.625768	8.207731	0.821813	7.751293	2.389917	1.418089	72.25739
6	0.031359	4.512003	2.728344	8.177699	0.819770	7.721429	2.540346	1.538694	71.96171
7	0.031393	4.509651	2.787146	8.163877	0.820599	7.750999	2.588863	1.571221	71.80764

Sample Period : July 1998 – June 2007

Variance Decomposition of NYSEALL:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.009913	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.014192	99.85527	0.000321	0.001070	0.051336	0.014845	0.028986	0.047765	0.000411
3	0.017338	99.73330	0.010810	0.004046	0.077959	0.042398	0.053351	0.076648	0.001482
4	0.019912	99.72149	0.015838	0.005058	0.079079	0.043524	0.040485	0.058153	0.036369
5	0.022150	99.67756	0.020355	0.026123	0.103763	0.040937	0.033727	0.053990	0.043542
6	0.024122	99.58857	0.020057	0.027242	0.100928	0.054423	0.050541	0.121293	0.036944
7	0.025797	99.54434	0.017994	0.026742	0.091860	0.091737	0.047438	0.145449	0.034445

Variance Decomposition of AUSTOLD:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.005997	1.668848	98.33115	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.009100	27.01747	72.63128	0.008712	0.227085	0.022434	0.008416	0.062548	0.022062
3	0.011323	35.54165	63.86382	0.049583	0.373513	0.050681	0.005467	0.054226	0.061058
4	0.013408	39.86347	59.39496	0.086695	0.436983	0.055936	0.013873	0.061371	0.086712
5	0.015170	42.95329	56.13635	0.140843	0.486863	0.063360	0.032013	0.101512	0.085770
6	0.016722	45.18760	53.88239	0.155786	0.454097	0.056325	0.074618	0.096979	0.092203
7	0.018115	46.56083	52.42010	0.159545	0.416165	0.059941	0.164387	0.082647	0.136379

Variance Decomposition of HANGSENG:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.012845	2.111999	11.54925	86.33875	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.019225	16.14125	8.739210	74.75900	0.301628	0.023056	0.009797	0.025352	0.000711
3	0.023916	21.90438	7.673672	69.73290	0.649697	0.014939	0.007431	0.016526	0.000461
4	0.028073	25.55807	7.639307	65.84351	0.906720	0.020665	0.005410	0.024593	0.001730
5	0.031792	28.39169	7.471204	63.17978	0.895502	0.016716	0.012428	0.028564	0.004114
6	0.034880	30.33162	7.302988	61.36308	0.910314	0.034414	0.010422	0.032832	0.014326
7	0.037669	31.12786	7.285261	60.51398	0.912815	0.034272	0.040832	0.049320	0.035653

Variance Decomposition of NIKKEI:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.012704	2.205923	11.23300	6.820926	79.74015	0.000000	0.000000	0.000000	0.000000
2	0.018211	14.66393	10.05740	6.144973	69.05869	0.024150	0.044032	0.001044	0.005786
3	0.022242	19.31076	8.807003	6.073063	65.70048	0.016211	0.086910	0.001686	0.003880
4	0.025597	21.99013	8.588362	5.966391	63.35507	0.012321	0.072761	0.001327	0.013638
5	0.028507	24.28885	8.396342	5.784729	61.37834	0.010371	0.060889	0.001070	0.079415
6	0.031240	26.03709	8.054914	5.534785	60.16333	0.013162	0.053299	0.001191	0.142220
7	0.033685	27.30538	7.728553	5.348596	59.33442	0.011722	0.051869	0.019546	0.199913

Variance Decomposition of KOSPI:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.018267	1.237432	7.993513	11.21724	3.731656	75.82016	0.000000	0.000000	0.000000
2	0.026817	9.626084	6.263194	11.24293	2.720872	70.10443	0.000314	0.001824	0.040353
3	0.032983	13.47709	6.241556	11.37476	2.144410	66.70417	0.005591	0.003226	0.049196
4	0.038226	16.41784	6.660359	11.66118	1.816098	63.39152	0.004622	0.009095	0.039287
5	0.042984	19.05977	6.549376	11.78296	1.591954	60.95413	0.003674	0.026211	0.031929
6	0.046838	20.62652	6.468741	12.24928	1.453173	59.14575	0.005496	0.022139	0.028891
7	0.050412	22.06390	6.442179	12.63578	1.385803	57.40920	0.007141	0.030840	0.025149

Variance Decomposition of SHANGHAI:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.014326	0.006883	0.694438	0.730742	0.021716	0.281125	98.26510	0.000000	0.000000
2	0.020352	0.030257	1.036968	0.845105	0.017232	0.226890	97.83140	0.011952	0.000195
3	0.024769	0.086264	1.190654	0.935202	0.014366	0.247513	97.43220	0.080606	0.013199
4	0.028867	0.068052	1.263156	1.254265	0.017232	0.255241	96.94431	0.154161	0.043581
5	0.032697	0.087579	1.397853	1.493184	0.016597	0.287480	96.47038	0.205099	0.041830
6	0.036074	0.168222	1.572637	1.774955	0.015381	0.370257	95.81347	0.248465	0.036617
7	0.038992	0.369849	1.637239	1.926116	0.017361	0.494257	95.17950	0.343752	0.031921

Variance Decomposition of TAIWGHT:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.014898	1.132549	2.707822	3.970049	1.779548	3.049807	0.070402	87.28982	0.000000
2	0.021661	6.449474	2.628143	5.585196	2.229690	3.426409	0.047750	79.62735	0.005986
3	0.027121	9.072850	2.615804	6.320324	2.320508	3.363387	0.045555	76.16382	0.097751
4	0.031960	10.84890	2.499653	6.405854	2.301910	2.998298	0.035653	74.56128	0.348448
5	0.035737	12.75293	2.369625	6.452226	2.283106	2.831894	0.070355	72.67034	0.569517
6	0.039437	14.31585	2.369982	6.432948	2.158967	2.941321	0.067124	70.91497	0.798832
7	0.042765	15.76486	2.345466	6.358055	2.102895	3.050439	0.059285	69.47697	0.842040

Variance Decomposition of JAKCOMP:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.014641	0.228882	3.129781	4.350264	0.275875	0.958072	0.062711	0.396545	90.59787
2	0.022397	3.530388	2.476535	4.953731	0.117960	1.423160	0.132464	0.303079	87.06268

3	0.028175	4.550849	1.937060	5.125516	0.075122	1.935097	0.149765	0.294013	85.93258
4	0.032999	5.735119	1.883914	4.785677	0.062704	2.277844	0.119969	0.323213	84.81156
5	0.037297	7.169116	1.860465	4.615988	0.115991	2.723682	0.096988	0.335994	83.08178
6	0.041260	8.330199	1.747070	4.572215	0.172835	3.564479	0.080245	0.291000	81.24196
7	0.044712	9.427804	1.684870	4.411457	0.178094	4.052330	0.071243	0.306133	79.86807

Sample Period : July 2007 – May 2009

Variance Decomposition of NYSEALL:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.022384	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.029435	98.97472	0.095510	0.036787	0.034269	0.283885	0.136297	0.052235	0.386299
3	0.033767	96.93811	0.530812	0.115060	0.215368	0.304539	0.122035	0.492989	1.281092
4	0.038057	97.01678	0.551549	0.100134	0.171191	0.321918	0.122163	0.404923	1.311338
5	0.041546	96.86511	0.472876	0.087900	0.334792	0.270857	0.111511	0.532895	1.324056
6	0.044249	96.28553	0.417163	0.112111	0.538917	0.577646	0.341883	0.495357	1.231398
7	0.046528	95.83779	0.396563	0.101939	0.842397	0.657159	0.381636	0.606467	1.176053

Variance Decomposition of AUSTOLD:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.012255	8.924588	91.07541	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.020502	51.02541	46.72477	0.250977	0.577619	0.011392	0.217105	0.003599	1.189128
3	0.025429	59.36506	36.86783	0.168184	0.759653	0.018629	0.223840	0.321779	2.275018
4	0.029297	65.04529	29.61929	0.171431	1.190787	0.050582	0.176356	0.657109	3.089153
5	0.033129	68.54263	25.21910	0.459633	1.193633	0.152539	0.137991	0.709579	3.584903
6	0.036945	70.00838	23.32919	0.515421	1.192940	0.578133	0.599648	0.611409	3.164885
7	0.040044	70.58938	22.62357	0.582269	1.307852	0.584564	0.847475	0.524001	2.940889

Variance Decomposition of HANGSENG:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.023547	15.64154	21.19853	63.15993	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.034773	42.97299	11.66866	42.92437	0.431433	0.654875	0.668941	0.243702	0.435032
3	0.042929	49.30657	8.301719	38.51883	1.260633	0.931977	0.638895	0.160140	0.881237
4	0.049455	53.70961	6.464497	35.48640	1.735399	0.987579	0.486117	0.122985	1.007409
5	0.054934	55.49457	5.455081	34.16046	2.390677	0.802980	0.406949	0.173221	1.116053
6	0.059569	56.21145	5.105615	32.93672	3.294654	0.704657	0.500855	0.168005	1.078050
7	0.063874	56.29873	5.258873	31.63254	4.311116	0.615733	0.625365	0.268393	0.989251

Variance Decomposition of NIKKEI:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.017451	10.15854	16.90781	7.879068	65.05459	0.000000	0.000000	0.000000	0.000000
2	0.028443	50.60479	7.918168	4.302209	36.18269	0.097855	0.409146	0.136535	0.348609
3	0.034936	59.62367	5.647754	4.496276	28.34730	0.195149	0.282844	0.091416	1.315583
4	0.039356	63.52151	4.455451	4.423584	24.42649	0.433974	0.225546	0.161684	2.351768
5	0.043474	66.03983	3.723235	4.122660	22.42357	0.540952	0.201015	0.181725	2.767019
6	0.047369	67.71325	3.551609	4.080711	20.49641	0.738574	0.240250	0.255615	2.923574
7	0.050278	68.81439	3.877392	4.007446	19.09011	0.770319	0.446651	0.226947	2.766749

Variance Decomposition of KOSPI:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.018661	11.95328	19.49261	13.23750	8.241590	47.07502	0.000000	0.000000	0.000000
2	0.028118	32.36224	11.93637	8.751410	3.898691	42.09979	0.242105	0.157246	0.552154
3	0.034707	37.53020	9.045085	10.28542	2.577104	39.30800	0.212438	0.114425	0.927332
4	0.040805	40.29782	6.963011	10.05947	1.864366	39.75971	0.174202	0.090071	0.791345
5	0.045209	41.38424	6.430024	10.00938	1.559356	39.70872	0.143779	0.081944	0.682553
6	0.048865	42.84736	7.244340	9.502184	1.434213	38.17870	0.134341	0.073762	0.585105
7	0.052221	43.41581	7.857305	9.333199	1.373831	37.30188	0.133078	0.066933	0.517961

Variance Decomposition of SHANGHAI:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP

1	0.023601	1.248141	3.874734	20.68633	0.002121	0.607395	73.58128	0.000000	0.000000
2	0.033663	7.196824	2.592517	19.46235	0.616069	0.948652	68.59203	0.045063	0.546499
3	0.041230	9.868114	1.831657	20.61759	0.715522	0.966365	65.46717	0.085438	0.448137
4	0.047962	10.80239	1.457275	20.57937	0.770802	1.220023	64.68191	0.133704	0.354533
5	0.054868	12.61435	1.286753	20.78768	0.801254	1.259136	62.46765	0.313220	0.469953
6	0.060675	14.48247	1.255730	20.21763	1.334720	1.526496	60.04693	0.581896	0.554131
7	0.066458	16.76746	1.329942	19.28106	1.818504	2.100787	57.18311	0.819787	0.699349

Variance Decomposition of TAIWGHT:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.017052	5.144398	14.52840	9.565980	3.019913	10.61745	0.445090	56.67877	0.000000
2	0.025610	24.63307	9.682474	9.806372	1.460969	8.555006	0.200821	44.64906	1.012220
3	0.032533	29.09953	7.629473	9.954349	1.024438	7.391208	0.290940	42.88542	1.724642
4	0.038400	32.68829	6.078140	9.638269	0.741081	7.669725	0.591161	40.39358	2.199751
5	0.043147	34.86259	5.328219	8.933611	0.654551	7.059614	0.686583	40.15287	2.321966
6	0.046923	36.06649	5.580263	8.308020	0.740887	6.204122	0.778341	40.08782	2.234056
7	0.050102	36.19133	5.724836	8.208332	0.956599	5.575282	0.912550	40.36193	2.069142

Variance Decomposition of JAKCOMP:

Period	S.E.	NYSEALL	AUSTOLD	HANGSENG	NIKKEI	KOSPI	SHANGHAI	TAIWGHT	JAKCOMP
1	0.018829	7.584436	12.50558	11.29323	0.196759	1.546823	0.091584	1.752568	65.02903
2	0.030307	22.24796	6.505714	8.555757	0.118150	1.410176	0.091400	0.684540	60.38630
3	0.039873	27.22689	4.438481	7.907310	0.071508	2.069981	0.060645	0.395468	57.82972
4	0.047844	31.50559	3.583548	8.174059	0.053229	2.615517	0.062506	0.280533	53.72501
5	0.054347	34.18303	3.203046	7.637742	0.042263	2.445557	0.103921	0.287478	52.09696
6	0.059941	36.52147	3.260214	7.117998	0.049351	2.590014	0.121923	0.251370	50.08766
7	0.064268	37.58693	3.412147	7.085142	0.106582	2.709704	0.125575	0.400472	48.57345