TRADE, VOLATILITY AND STOCK MARKET INTEGRATION

Bakri Abdul Karim and Hoe Xin Ning
Faculty of Economics and Business, Universiti Malaysia Sarawak (UNIMAS),
94300 Kota Samarahan, Sarawak.

ABSTRACT

This study investigates the relationship between macroeconomic forces and stock market integration in the ASEAN region. Using a Pooled OLS regression, we find that trade and volatility significantly influence the stock market integration in this region. As the ASEAN aspires to eliminate trade barriers among its member countries and their close economic relationship, the stronger the bilateral trade ties among the countries, the higher the degree of co-movements among their stock markets. In addition, the result also shows that the volatility is negatively related with market integration. Pretorius (2002) notes that if one market's volatility increases relative to another market's volatility, the first market's returns should increase relative to the second market's return. The study may have implications to international investors and policy-makers in this region.
Key words: Stock market integration; ASEAN; International Trade

1.   Introduction

The degree of stock market integration has major implications on potential benefits of international portfolio diversification and on financial steadiness of a country (Ibrahim, 2005). Some of the possible factors that lead to an increase in markets integration around the globe are financial deregulation and globalization, removal of investment barriers, financial innovation and technological advancement. In addition, studies also found that markets have become more integrated after the Asian and global financial crisis (see Arshanapalli and Doukas, 1993; Francis et al. 2002; Yang et al. 2003; and Majid and Kassim, 2009; Karim et al. 2010). Kearney and Lucey (2004) noted that the world's economic and financial systems are becoming increasingly integrated due to the rapid expansion of international trade in commodities, services and financial assets.

In addition, Chowdhury (2005) notes that many countries realise that trade liberalisation has important and far-reaching implication in the region. Cooperation among the neighbours not only strengthens the economic and financial sectors but also enhances greater political stability and social cooperation between member nations. ASEAN countries have tried to move forward to intra-regional economic cooperation. Intra-regional trade expansion is one of the efficient ways of integrating to the much larger international economy as the countries become more competitive (Chowdhury, 2005). Strong economic cooperation and close relationship among ASEAN member's countries has also contributed to the strong inter-linkages of their stock markets. There are voluminous studies such as Palac-McMiken (1997), Roca et al. (1998), Azman-Saini et al. (2002), Click and Plummer (2005), Cheng et al. (2003) and Majid et al. (2008), just to mention a few, documented that the ASEAN stock markets are integrated. However, there have been relatively scanty studies investigating the factors that drive the market integration in this region (see Pretorius, 2002). Thus, this study examines the forces behind the stock market integration in the region.

The rest of the paper is structured as follows. Section 2 explains the empirical framework and data description. The next section, offers empirical results and discussion. Finally, Section 4 presents provides conclusion.

2.   Empirical Framework and Data

We focus only five leading countries in the ASEAN region such as Malaysia, Singapore, Thailand, Indonesia and the Philippines. The stock market integration of two countries is measured using the standard correlation between daily rates of return of the two countries. We also use trade, inflation differentials, industrial production growth, interest rate differentials and volatility of the stock markets as determinants of stock market integration. We estimate the model as follows:

$$y_{it} = \alpha + \phi T_{it} + \pi I_{it} + \varphi G_{it} + \delta R_{it} + \sigma V_{it} + \varepsilon_{it} \qquad (1)$$

where
Y = Correlation between daily rate of return of countries *a* and *b*

T = Trade (Total imports and exports from country *a* to country *b* divided by total exports and imports of country *a*)
I = Inflation differentials between countries *a* and *b*
G = Industrial growth differentials between countries *a* and *b*
R = Interest rates differentials between countries *a* and *b*
V = Ratio of the variances of the returns in countries *a* and *b*

The data are obtained from Datastream, International Financial Statistics, International Monetary Fund (IMF) and from the IMF's Direction of Trade publication. All data are spanning from January 2001 to December 2010.

3.   Empirical Results
Table 1 provides summary statistics of the variables used. We note that the mean of correlation was 0.34 which indicates that ASEAN stock markets are integrated. In addition, we also can conclude that on average ASEAN markets contribute to 10% of a country bilateral trade. In addition, there exist a marginal different in terms of both growth rate and interest rate differentials in this region at 0.04% and 0.02% respectively. However, there gap of inflation differentials is consider high at 2.60%.

The results of the Pooled OLS estimation are reported in Table 2. We find that only trade and volatility were significant in influencing the stock market integration in the region while the others were insignificant.

Table 1: Summary Statistics

	Y	T	G	I	R	V
Mean	0.34	0.10	0.04	-2.59	-0.02	0.93
Maximum	0.76	0.33	8.37	8.83	1.37	7.76
Minimum	0.04	0.02	-7.28	-12.19	-1.28	0.12
Std. Dev.	0.16	0.07	2.66	3.84	0.41	1.00
Skewness	0.45	1.53	-0.04	-0.22	0.07	4.38
Kurtosis	2.66	4.56	4.14	3.67	4.28	26.50

Table 2: Regression Results

Variables	Pooled OLS
T	0.71^{***} (3.38)
G	-0.01 (-0.17)
I	0.01 (0.57)
R	-0.04 (-0.09)
V	-0.05^{***} (-3.12)
Constant	0.323^{***} (9.72)
R-squared	0.19
Adjusted R-squared	0.15
F-statistic	4.54^{***}

Notes: *** indicates significant at 1% level.

The findings are consistent with the view that the stronger the bilateral trade ties among the countries, the higher the degree of co-movements (Masih and Masih, 1999; Bracker *et al.* 1999; Pretorius, 2002; Kearney and Lucey, 2004; Karim and Majid, 2010). In addition, this might be due to geographical proximity and close

relationship between these markets (see Ng, 2002; and Janakiramanan and Lamba, 1998). From the results, we also find the negative relationship between correlation of the two stock markets and volatility. Pretorius (2002) notes that the two stock markets whose volatilities converge (diverge), the prices should also converge (diverge). Thus, if one market's volatility increases relative to another market's volatility, the first market's returns should increase relative to the second market's return. This reflects the higher the risk of an asset the higher its returns should be.

4.   Conclusion and Policy Implications

This study investigates the relationship between macroeconomic forces and stock market integration in the ASEAN region. Using a Pooled OLS regression, we find that trade and volatility significantly influence the stock market integration in this region. The findings are consistent with the view that the stronger the bilateral trade ties among the countries, the higher the degree of co-movements. Chowdhury (2005) argues that cooperation among the neighbours not only strengthens the economic and financial sectors but also enhances greater political stability and social cooperation between member nations. As far as volatility is concerned, Pretorius (2002) notes that the two stock markets whose volatilities converge (diverge), the prices should also converge (diverge). Thus, the return of any stock market is a function of its volatility. For example, two markets with more or less the same volatility should yield more or less the same returns.

Kasa (1992) and Blackman et al. (1994) argue that the existence of market integration among the stock markets also means a common stochastic trend in those markets. Since each stock price series contains information on the common stochastic trends (which bind all the markets together), the predictability of one country's stock prices can be enhanced significantly by using information on the other countries' stock prices (Karim and Majid, 2010).

Majid *et al.* (2008) argues that the effectiveness of the macro-economies policies of each ASEAN stock markets dealing with its stock market imbalances depends on the extent of financial integration of each market with the rest. Any shocks in the neighbour countries should be taken into consideration by others to design policies pertaining to their stock market. In addition, investors may find the opportunity from international diversification in this region might be limited as the markets are interdependent.

References

Abdul Majid, M.S. and Kassim, S.H. (2009). Impact of the 2007 US financial crisis on the emerging equity markets. *International Journal of Emerging Markets*, 4(4): 341-357.

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, 193-208.

Azman-Saini, W.N.W., Azali, M., Habibullah, M.S., and Matthews, K.G. (2002). Financial Integration and the ASEAN-5 Equity Markets. *Applied Economics*, 34, 2283-2288.

Blackman, S.C., Holden, K. and Thomas, W.A. (1994). Long-term relationships between international share prices. *Applied Financial Economics*, 4, 297-304.

Bracker, K., Dockling, D.S. and Koch, P.D. (1999). Economy determinants of evolution in international stock market integration. *Journal of Empirical Finance*, 6, 1-27.

Cheng, W.K., Leng, G.K., and Lian, K.K. (2003). Financial crisis and intertemporal linkages across the ASEAN-5 stock markets. *FEA Working Paper*. No. 2003-4.

Chowdhury, M.B. (2005). Trade reforms and economic integration in South Asia: SAARC to SAPTA. *Applied Econometrics and International Development*, 5(4), 23-40.

Click, R.W. and Plummer, M.G. (2005). Stock market integration in ASEAN after the Asian financial crisis. *Journal of Asian Economics*, 16, 5-28.

Francis, I., Kim, S., and Yoon, J.H. (2002). International stock market linkages: Evidence from the Asian financial crisis. *Journal of Emerging Market Finance*, 1, 1-29.

Ibrahim, M.H. (2005). International linkages of stock prices: The case of Indonesia. *Management Research News*, 28(4), 93-115.

Janakiramanan, S., and Lamba, A.S. (1998). An empirical examination of linkages between Pacific-Basin Stock Markets. *Journal of International Financial Markets, Institutions and Money,* 8, 155-173.

Karim, B.A. and Majid, M.S.A. (2010). Does trade matter for stock market integration. *Studies in Economics and Finance,* 27(1), 47-66.

Kasa, K. (1992). Common stochastic trends in international stock markets. *Journal of Monetary Economics*, 29, 95-124.

Kearney, C., and Lucey, B. M. (2004). International equity market integration: Theory, evidence and implications. *International Review of Financial Analysis,* 13, 571- 583.

Majid, M.S.A, Meera, A.K.M., and Omar, M.A. (2008). Interdependence of ASEAN-5 stock markets from the US and Japan. *Global Economic Review*, 37(2), 201-225.

Masih, A. M. M., and Masih, R. (1999). Are Asian stock market fluctuations due mainly to intra-regional contagion effects? Evidence based on Asian emerging stock markets. *Pacific- Basin Finance Journal*, 7, 251–82.

Ng, T.H. (2002). Stock market linkages in South-East Asia. *Asian Economic Journal*, 16, 353-377.

Palac-MicMiken, E.D. (1997). An examination of ASEAN stock markets: A cointegration approach. *ASEAN Economic Bulletin*, 13, 299-311.

Pretorius, E. (2002). Economic determinants of emerging stock market interdependence. *Emerging Markets Review*, 3, 84-105.

Roca, E.D., Selvanathan, E.A., and Shepherd, W.F. (1998). Are the ASEAN equity markets interdependent. *ASEAN Economic Bulletin,* 15, 109-120.

Taylor, M. P., and Tonks, I. (1989). The internationalization of stock markets and the abolition of U.K. exchange control. *Review of Economics and Statistics,* 71, 332-336.

Yang, J., Kolari, J.W. and Min, I. (2003). Stock market integration and financial crisis: the case of Asia. *Applied Financial Economics*, 13, 477-486.