Study On Relationships Between Financial Markets In The US And ASEAN Countries

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ABSTRACT

This study examines dynamics of inter-market relationships among financial markets in the US and 5 ASEAN countries in the framework of the Vector Autoregressive model. This study uses daily returns of the MSCI market indexes around the Asian economic crisis for a period of 1992~2006 and three 3 sub-periods (pre-, during-, and post-crisis). The major findings are: 1) the U.S. influence remained strong in ASEAN markets for this period, 2) ASEAN markets had little impacts on the U.S. markets; and 3) the integration between the U.S. and ASEAN markets and among ASEAN markets had not increased during this period. Thus, there still exist much diversification benefits to be exploited in ASEAN markets.

I. INTRODUCTION

In recent years, emerging markets have been gradually open to foreign investments due to deregulations and lower barriers to foreign investments. Financial openness is good to discipline macroeconomic policies, increase financial efficiency of domestic firms (more global competition), and unleash forces leading to better corporate governance. When barriers to foreign investments are removed, firms could better allocate funds to most productive projects and find the most efficient source(s) of funds (lowering the cost of capital). Foreign capital inflows may increase competition for more productive projects, resulting in faster economic growth and higher efficiency in financial markets of host countries. Then, financial markets will become more integrated, reducing diversification benefits due to higher correlations between various types of assets or industries across nations.

This study is to examine dynamics of intermarket relationships among financial markets in the US and the ASEAN (Association of Southeast Asian Nations) countries. The ASEAN, formed in August 1967, was originally composed of five countries (i.e., Indonesia, Malaysia, Singapore, the Philippines, and Thailand). The membership gradually expanded to 11 countries with the following 6 countries (i.e., Brunei, Darussalam, Cambodia, Laos, Myanmar, and Vietnam). In 1992, the ASEAN made an agreement of "Free Trade Area" to promote regional trades among the member countries and the region's competitive advantages. The question is whether the regional economic block of this nature improved the integration of financial markets in this region.

There have been three groups of studies on intermarket relationships between financial markets in Asia. The first group of studies examined financial markets integration before the Asian crisis (June 1997). Bailey and Stulz (1990) examined the benefits of global portfolio diversification across Pacific Basin stock markets during 1977~1985 and reported that returns of the U.S. and Asian equity markets are highly correlated. Montiel (1993) showed relatively high capital mobility between Asian markets (i.e., Korea, Malaysia, the Philippines, Singapore, and Thailand) (supporting the more integration hypothesis). DeFusco et al. (1996) found no cointegration between the U.S. and other Asian financial markets (i.e., Hong Kong, Korea, Malaysia, the Philippines, Singapore, Taiwan, and Thailand), suggesting there was no long-run relationship (or interaction) between markets. Palac-McMiken (1997) noted that Asian markets were strongly linked only with the Thailand market during 1987-1995 with an exception of Indonesia. Garret and Spyrou (1997) noted that Pacific-basin stock markets (i.e., India, Malaysia, the Philippines, and Thailand) had a minimal inter-dependency except for S. Korea and Taiwan.

The second group examined the impacts of economic crises on the path of financial markets integration

after the Asian crisis. Roca, Selvanathan, and Shepherd (1998) found that ASEAN-5 financial markets are closely linked in the short run but not in the long run, and only two--Singapore and Thailand--markets had strong linkages with other markets in the region. Ghosh et al. (1999) reported that there are three types of markets during 1997~1998: The first group (i.e., Hong Kong, Korea, Malaysia) was heavily influenced only by the U.S. stock market; the second group (i.e., Indonesia, Singapore, the Philippines) was significantly influenced only by Japanese market; and the third group (i.e., Thailand, Taiwan) was not affected by any other markets. Worthington et al. (2003) found that Asian stock markets are highly integrated before and after the crisis; the intermarket relationships in developed and emerging economies became weaker; four markets (i.e., Hong Kong, Japan, Korea, Singapore) accounted for most of the causal relationships before the crisis; and the other two (i.e., Thailand, Taiwan) markets accounted for significant causal relations after the crisis.

The third group examined the cointegration and causal relations between financial markets. Yang et al. (2003) reported that the long-run cointegration and short-term causal linkages between financial markets became stronger during the Asian crisis; financial markets became more integrated after the crisis; the US market had significant impacts on the Asian markets during the Asian crisis; and Japanese market had little impacts on the Asian markets except for the during-crisis period. Laurenceson (2003) found that China and ASEAN-5 have strong linkages with respect to goods and services markets, and the level of their financial integration was rather weaker. Park (2005) noted that the level of financial integration significantly improved during and after the Asian crisis. Fooladi and Rumsey (2006) suggested that despite the high integration during 1988~2000, the diversification benefits (in US dollars) persist, and the increase in co-movements between equity market returns (in local currency) had been counterbalanced by movements of exchange rates. Chai (2003) noted that during the 1990s, Asian financial markets have become more integrated; the US influence remains strong in Asian markets; but financial integration is not accompanied by financial efficiency in this region.

Empirical studies thus far suggested that financial markets of developed countries became more integrated, and there had been weak evidences of financial market integration among developing and under-developed markets. And the empirical studies failed to provide a consensus on integration between the ASEAN financial markets around the Asian economic crisis. The event of this nature, if not managed carefully, could significantly change the fundamentals of financial market relationships in the ASEAN countries, where most economies are open, small, and in a similar stage of fast growth and developments. This study is to fill the gap in the literature regarding the integration between ASEAN financial markets by examining dynamic relationships between financial markets in the U.S. and ASEAN countries. The ASEAN-5 countries are chosen due to their relatively long history of economic collaboration at a similar stage of economic developments between the member countries. This study will provide answers to the following questions: 1) whether the ASEAN financial markets become more integrated around the Asian crisis; 2) whether the U.S. market had strong influence on ASEAN markets; and 3) whether financial markets of ASEAN countries had significant impacts each other. It is of great importance to know dynamic relationships between financial markets so that multinational managers and investors could better control their foreign exposures to reduce risk without sacrificing returns when investing in foreign countries.

This study proceeds as follow. Section II discusses data and empirical methodologies. Section III discusses empirical results, and Summary and Conclusion follow in Section IV.

II. DATA AND EMPIRICAL TESTS

This study uses daily returns of the Morgan Stanley Capital International (MSCI) market indices (DataStream International) during January 1992~Sept. 2006. To better account for the impacts of the Asian crisis (June 1997), this period is divided into three sub-periods, namely pre-crisis (1992.1~1996.5), during-crisis (1996.6~1998.8), and post-crisis (1998.9~2006.9).

Empirical tests proceed as follows. The first step is to examine the stationarity of the MSCI market indexes by using the Augmented-Dickey-Fuller (Dickey and Fuller (1979), Granger (1988)) and the Phillips-Perron test (Perron 1990). The second step is to examine dynamics of intermarket relationships in the framework of the Vector Autoregressive (VAR) model:

$$\boldsymbol{Y = BZ + U} \tag{1}$$

$$\boldsymbol{Y} = [y_p \quad y_{p+1} \quad \cdots \quad y_T] \tag{2}$$

$$\boldsymbol{B} = [c \quad A_1 \quad A_2 \cdots \quad A_p] \tag{3}$$

$$\boldsymbol{U} = [e_p \quad e_{p+1} \quad \cdots \quad e_T] \tag{4}$$

$$\boldsymbol{Z} = \begin{bmatrix} 1 & \cdots & 1 \\ y_{p-1} & \cdots & y_{T-1} \\ y_{p-2} & \cdots & y_{T-2} \\ \vdots & \ddots & \vdots \\ y_0 & \cdots & y_{T-p} \end{bmatrix} \tag{5}$$

where **Y** refers to the matrix of individual market returns, **B** the coefficient matrix, **Z** a matrix of lagged returns for each index, and **U** the error-term matrix. Model (1) will be estimated by using the OLS regression.

III. EMPIRICAL RESULTS

The results by the Augmented-Dickey-Fuller model (Dickey and Fuller (1979)) and the Phillips-Perron model (Perron 1990) show that the original series are not stationary, but the first-differenced series (i.e., log-returns) are stationary. Thus, the log-return series are used in this study. The second step is to examine the intermarket relationships between the U.S. and ASEAN markets, following the Vector Autoregressive (VAR) model with various lags (up to 5). Among various models, the VAR (1) model (with lag 1) is found most suitable for the series, based on the two (i.e., AIC and SIC) criteria.

Before the Asian crisis, the U.S. remained strong in ASEAN markets, but ASEAN markets had little impacts on the U.S. market (one-way impact). An exception is that Thailand (originator of the Asian crisis) had significant impacts on the U.S. only before the crisis. Indonesia was significantly affected by three markets (i.e., Malaysia, the Philippines, and Thailand) and the U.S. and indirectly affected by Singapore (through Malaysia and Thailand). Singapore had significant impacts on Malaysia and Thailand, which in turn had significant impacts on Indonesia. There was one strong interaction between Indonesia and the Philippines, which are relatively under-developed countries. Thailand was significantly affected by Singapore while Singapore was significantly affected by the U.S. only. These results suggest that the U.S. remained strong in ASEAN markets; ASEAN markets had little impacts on the U.S. markets (with an exception of Thailand); and there was no interaction between financial markets except that between Indonesia and the Philippines.

Table 1: The Intermarket Relationships Before the Asian Crisis

		Indonesia	Malaysia	Philippines	Thailand	Singapore	US
Indonesia	(t-1)	0.3107	0.0014	0.0858	0.0479	-0.0074	0.0414
		0.0000 *	0.9660	0.0308 *	0.2908	0.7661	0.0560
Malaysia	(t-1)	0.0524	0.1295	0.0403	0.0238	0.0249	-0.0021
		0.0258 *	0.0000 *	0.2682	0.5678	0.2742	0.9173
Philippines	(t-1)	0.0429	-0.0168	0.1714	0.0434	-0.0118	0.0019
		0.0128 *	0.4502	0.0000 *	0.1545	0.4812	0.8965
Thailand	(t-1)	0.0337	0.0370	0.0393	0.1340	0.0058	-0.0357
		0.0312 *	0.0672	0.1044	0.0000 *	0.7041	0.0068 *
Singapore	(t-1)	0.0509	0.1256	0.0835	0.1458	0.1131	0.0071
		0.1027	0.0019 *	0.0844	0.0083 *	0.0002 *	0.7870
US	(t-1)	0.1398	0.2342	0.2417	0.2246	0.2677	0.0627
		0.0000 *	0.0000 *	0.0000 *	0.0001 *	0.0000 *	0.0178 *

Note: The numbers in the second line refer to the p-values. The asterisk (*) denotes significance at the 5-% significance level.

During the crisis, the U.S. was still dominant over ASEAN markets. Indonesia had significant impacts on three--Malaysia, the Philippines, and Singapore-- markets. The Philippines was significantly affected by all other

ASEAN markets and the U.S. Indonesia and Thailand were significantly affected by the U.S. only, but there was no interaction between ASEAN markets.

Table 2: The Intermarket Relationships During the Asian Crisis

	Indonesia	Malaysia	Philippines	Thailand	Singapore	US
Indonesia (t-1)	0.1777	0.0798	0.1078	0.0699	0.0551	0.0242
	0.0000 *	0.0415 *	0.0003 *	0.0720	0.0336 *	0.2181
Malaysia (t-1)	-0.0073	0.1363	0.0667	0.0275	0.0476	0.0269
	0.8737	0.0016 *	0.0427 *	0.5207	0.0959	0.2132
Philippines (t-1)	-0.0263	0.0674	0.1075	-0.0066	0.0224	-0.0303
	0.6359	0.1996	0.0073 *	0.8991	0.5200	0.2500
Thailand (t-1)	0.0869	-0.0051	0.0793	0.0473	0.0221	0.0145
	0.0624	0.9081	0.0182 *	0.2794	0.4483	0.5118
Singapore (t-1)	0.0976	-0.0760	0.1431	0.1281	0.0774	-0.0326
	0.1785	0.2675	0.0061 *	0.0594	0.0881	0.3428
US (t-1)	0.4421	0.3904	0.3823	0.2993	0.3736	0.0292
	0.0000 *	0.0000 *	0.0000 *	0.0002 *	0.0000 *	0.4645

After the crisis, the U.S. remained strong with significant impacts on all ASEAN markets. In contrast to the result before the crisis, Indonesia was significantly affected by all other ASEAN markets and the U.S. The Philippines was affected by Thailand and the U.S., while Singapore was affected by Malaysia and the U.S. There was not observed any interaction between ASEAN markets.

Table 3: The Intermarket Relationships After the Asian Crisis

	Indonesia	Malaysia	Philippines	Thailand	Singapore	US
Indonesia (t-1)	0.1083	0.0146	-0.0073	0.0255	0.0180	-0.0229
	0.0000 *	0.3786	0.7461	0.3622	0.3664	0.3325
Malaysia (t-1)	0.1175	0.1576	-0.0129	0.0412	-0.0857	-0.0005
	0.0030 *	0.0000 *	0.7215	0.3569	0.0071 *	0.9884
Philippines (t-1)	0.1614	-0.0286	0.1466	0.0028	0.0073	0.0104
	0.0000 *	0.1280	0.0000 *	0.9295	0.7456	0.6961
Thailand (t-1)	0.1110	0.0246	0.0769	0.0541	0.0063	0.0183
	0.0000 *	0.1299	0.0005 *	0.0480 *	0.7466	0.4267
Singapore (t-1)	0.1536	0.0119	0.0456	-0.0317	0.0135	-0.0041
	0.0000 *	0.6067	0.1475	0.4148	0.6250	0.9005
US (t-1)	0.0001	0.1716	0.2034	0.2067	0.2520	0.0202
	0.9966	0.0000 *	0.0000 *	0.0000 *	0.0000 *	0.4420

IV. SUMMARY AND CONCLUSION

This paper examined dynamics of intermarket relationships between financial markets in the U.S. and ASEAN-5 countries by using daily MSCI returns for a period of 1992~2006. The major findings are: 1) the U.S. influence remained strong in ASEAN markets for this period; 2) the integration between the U.S. and ASEAN markets and among ASEAN markets had not increased; and 3) there was no interaction between ASEAN markets. The results suggest that ASEAN markets were not strongly integrated, there still exist much diversification benefits to be exploited in this region, and investors need to consider investing in these small, open and developing markets

to take advantage of diversification benefits. Future studies need to consider the impacts of other regional factors (e.g., North America, Europe) on financial markets when examining the impacts of other economic and/or financial events (e.g., Russian crisis (1998)) on financial markets.

AUTHOR INFORMATION

Hong Rim is a graduate from Pennsylvania State University (Ph.D. in Finance) has been a professor of Finance since 1986 and the chair (Dept. of Finance & Supply Chain Management) at Shippensburg University (PA, USA). His research interest is in the areas of event studies (financial crises, impacts), comparative studies (financial markets, exchange markets), foreign exchange markets (ER determination, efficiency, diversification, derivatives, investment), integration and volatility spillovers, pricing of exchange-rate risk, and inter-market (lead/lag, correlations) relationships. His papers have been published in such journals as *Journal of Business Finance and Accounting, Journal of Applied Business Research, International Journal of Finance, International Business and Economics Research Journal, Global Business and Finance Review, Financial Practice and Education, Journal of Business Research,* and *Pacific-Basin Finance Journal*. He was a visiting faculty at Bangkok University (Bangkok, Thailand; 2010), a visiting faculty at Kyungpook National University (Taegu, S. Korea; 2010), and a Fulbright scholar at University Malaysia Sabah (Sabah, Malaysia; 2001).

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