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Capital Market Integration: Vietnam and Its Connection with ASEAN Peers

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Abstract
There have been many initiatives planned and implemented by the authorities to raise the level of financial market integration in Southeast Asia to reap potential benefits and though the importance of Vietnam in the region has continued to grow, only a small number of research has considered its stock markets. This paper investigates the extent and nature of integration of two Vietnamese stock markets (Ho Chi Minh and Hanoi exchanges) and other peers in ASEAN-5 countries from January 2009 until December 2013, using cointegration techniques and the Granger Causality approach. The empirical results suggest evidence of some degree of integration such that the gains of international investors holding a diversified portfolio in the region may have been reduced but not eliminated and policymakers and regulators will have to consider monitoring and driving the developments in the future.

1. Introduction

In the past decades, the growth of new emerging countries has been rapid. These economies become significant as world economic driving factors and investment destination. Most of these markets are scattered in South America and Asia. Among each group of these emerging markets, there have been initiatives to cooperate to enhance their competitiveness and economic significance. Among ASEAN countries, the initiative has started in 1967 when 5 ASEAN countries declared the Association of Southeast Asian Nations (ASEAN). The founding members include Indonesia, Malaysia, the Philippines, Singapore, and Thailand. Today, there are 10 member-states of ASEAN and the cooperation has been greatly heightened. ASEAN is the sixth largest economy in the world and the third largest community by its population. The region has attracted immense capital flows and trades most of which are from intra-regional activities (ASEAN Secretariat, 2017). The recent milestone development includes the establishment of ASEAN Economic Community (AEC) and the ASEAN capital markets to facilitate greater trade and investment flows across the region.

The capital market development and integration require deep and liquid capital markets to channel funds and expand investment opportunities for investors. It is undeniable the ASEAN members are at their different pace of an infrastructure development resulting in an uneven relationship among them. Several researches examined the degree of financial integration among ASEAN countries. Some of these papers focused on the regional connection among ASEAN-5 alone while some investigated integration of ASEAN and non-member countries (Sharma & Wongbangpo, 2002; Click & Plummer, 2005; Chen, Gerlach, Cheng, & Yang, 2009; Majid, Meera, Omar, & Aziz, 2009; Aizenmanm, Jinjarak, Lee, & Park, 2016; Caporale, Gil-Alana, & You, 2017; Rahman & Shahari, 2017). The finding of these researches is still mixed.

However, there is a limited research on Vietnam financial markets, the latest stock markets of ASEAN, and their connection with financial markets in other countries. Vietnam has experienced a significant change in the last few decades. With its population growing from

66.01 million in 1990 to 92.70 million in 2016, the country's GDP has grown from $6.47 billion to $205.27 billion and the GDP per capita has jumped from $0.09 million to $2.17 million (World Bank, 2018). As an economy has expanded, financial market, banking system and the stock markets have been established. The stock market mechanism is believed to be effective economic tools to generate competition on financial markets reducing the cost of borrowing and foster a sound corporate governance among businesses (Wang, Chang, Jin, & Bui, 2013).

As the first stock exchange in Vietnam, The Ho Chi Minh City Stock Exchange (HOSE) was established in July 2000. However, prior to 2002 the market only traded on alternate days and it was not until 2005 that the market has undergone a rapid growth and a rise in liquidity. As of 2017, there were 396 securities listed on the HOSE with a market capitalization of approximately $28 billion (Ho Chi Minh Stock Exchange, 2017). Hanoi Stock Exchange (HNX) was officially launched in 2005 with its first name as Hanoi Security Trading Center (HaSTC). It has been a second trading center in Vietnam. The market was re-organized and renamed in 2009 and as of 2017, The HNX's Market Capitalization was $7.1 Billion (Hanoi Stock Exchange, n.d.).

This research aims to examine the integration between Vietnam stock markets and other ASEAN stock markets using Granger causality test to determine the intra-regional relationship between the new and the existing financial markets of the cooperative region. The study will also signal the effectiveness of cooperation in terms of capital flows and financial market liberalization. The results will benefit not only academia in the field of financial integration, but also serve investors since the linkages between stock markets have important implications on portfolio diversification, as well as, policy makers and regulators who need to monitor financial market development and its consequences on economic growth. Moreover, unlike some previous works, this research contributes to the literature by investigating both the Ho Chi Minh and Hanoi stock exchanges of Vietnam separately to better understand their relationships with the ASEAN-5 markets.

2. Literature Review

As the sixth largest economy in the world and the third largest market in Asia, ASEAN has enjoyed great flows of capital and cross border trades. In 2015, ASEAN attracted $121billion of investment with intra-region activities constituting the largest share of the flows (ASEAN Secretariat, 2017). These increasing cross-border capital movements are partly the results of financial integration which improves financial system and efficiently allocates funds to maximize productivity across the region (Yuhn, 1997; Beine & Candelon, 2011; Park & Lee, 2011; Bai & Zhang, 2012; Rahman & Shahari, 2017). The importance of capital market integration is even larger after the Asian Financial Crisis in 1997-1998 when investors depend less on traditional bank loan financing. The linkage among countries in the region has been strengthened and the financial system has been improved leading to regional macroeconomic infrastructure and liquidity support.

Financial integration expands the size-constrained of domestic saving pool and allow capital to flow from resource-abundant countries to resource-scarce destination (Lucus, 1990). In addition, integrated regional financial markets are more appealing to investors outsides the region as shares become more liquid. Listed companies can expand their stock holders base and reduce transaction cost (Freeman, 2000). Feldstein and Horioka (1980) suggested that the financial integration lower the cost of trade, offer more diversified investment, provide a safe haven when economic activities highly fluctuate. According to Click & Plummer (2005), an integrated stock market is more efficient than segmented national capital markets. It signals market efficiency allowing investors from all member countries to allocate funds in any location in the region where their capital is most productive.

Cost of financing decreases as the degree of competition rises. However, there is no universally accepted definition of financial or capital market integration. The concept has been defined by Llewellyn (1980) as equality and co-movement of interest rates, the co-movement of exchange rates, and the transfer of money across countries. In the work of Marston (1995), financial market integration involves two interrelated conditions: the deregulation of national markets and the liberalization of international capital flows. Park (2013) supported the condition raised by Marston (1995) that even exact definition of financial integration is still being discussed, many agree that it is closely related to the financial openness and capital mobility.

An integration of ASEAN financial markets has been the topic of interest among researchers. Various methodologies were used to quantitatively assess the financial liberalization. Researchers might rely on the number of legal restrictions on regional capital flows or use the actual measure of the cross-border capital flows itself since they reflect the degree of openness in practice, not how the market appears to open legally (Park, 2013). An early work of Click & Plummer (2005) considered the degree to which the ASEAN-5 stock markets are correlated as a way to assess investment and diversification potential of ASEAN stock markets. The work has been supported by Majid, Meera, Omar, & Aziz (2009) who examined the interdependence among ASEAN-5 using Johansen & Juselius (1990) cointegration test and the Generalized Method of Moments (GMM). Their results indicated cointegration among ASEAN-5 both before and after the Asian financial crisis and the connection among ASEAN-5 has become stronger overtime.

Chen et al. (2009) expand the research empirically by exploring the structural break on the level of financial integration among ASEAN-5. Using data from 1994 to 2005, the cointegration found among ASEAN are consistent with Click & Plummer (2005) and Majid et al. (2009). You, Fung, & Tam (2010) used high-frequency indicators to show that the financial market integration among 10 Asian countries including ASEAN-5, Hong Kong, Taiwan, South Korea, and Japan is not complete. The degree of integration between mature and emerging markets varies due to the difference in political, economic, and institutional aspects of each countries. Chien, Lee, Hu, and Hu (2015) examined the dynamic cointegration among ASEAN-5 and China to support prior research that the cointegration among the ASEAN-5 is incomplete. China has become more important in ASEAN economies and the relationship between China financial market and the market of ASEAN-5 varies across the countries. The relation between ASEAN and China has also been examined by Nguyen & Elisabeta (2016). The paper focused only on the fast-growing ASEAN economies: Indonesia, Malaysia, Thailand, and the Philippines. Using beta and alfa convergence, the authors showed that the integration among the 4 countries of ASEAN and China are time-varying but higher during the financial crisis

Caporale et al. (2017) and Maharakkhaka, Ramasoot, & Kluaymai-ngarm (2017) have expanded the research in ASEAN financial market integration to include regional and global markets. Caporale et al. (2017) studied integration among 10 emerging Asian economies and the Japan to assess degree of regional cointegration and focus on the integration between the 10 emerging Asian countries and the U.S. to examine global financial market integration. Their evidence suggested regional rather than global integration during 2000-2016 sample period. Maharakkhaka et al. (2017) explored the cointegration among equity markets of the ASEAN-5 and other 12 financial markets from Asia, Europe, U.S., and Australia. The findings indicated time-varying relationship among financial markets. Higher level of regional and global integration was found during the financial crisis. After the crisis, the interdependence among the market lessens. These results reflect the reformation and the development of financial market structure in ASEAN after the 1997-1998 financial crisis.

Among the 10 country-states of ASEAN, Vietnam has been the latest country to officially launched its equity markets. The Ho Chi Minh City Stock Exchange (HOSE) was established in July 2000 and the Hanoi Stock Exchange (HNX) was officially launched in 2005. Though in the first stage, the market was young and less active, it has later expanded with a rapid growth. (Wang et al., 2013). However, there are only limited number of research paper in financial cointegration topic that concerns Vietnam stock markets in their studies. Of those papers that include Vietnam in their study is the work of Kim, Kim, & Choi (2015) who investigated the linkage among stock markets in Asia-Pacific regions using smooth transition auto regressive (STAR) model and Granger causality test. With limitation in data, the range of data series varied for each country in the study and the results indicated different level of interconnection among Asia-Pacific stock markets.

Jiang, Nie, & Monginsisi (2017) employed wavelet and Variation Modes Decomposition (VMD)-based copula estimation to study the co-movement and volatility fluctuation between ASEAN stock markets. Based on the data from 2009-2016, the paper considered the establishment of ASEAN exchange in 2012 and concluded that there has been a strong degree of integration and co-movement among ASEAN stock markets, except Vietnam. ASEAN stock markets tends to move tightly together particularly during the crisis. The interdependence among these ASEAN countries has existed before the establishment of the trading link. Since there are limited research on Vietnam financial markets, this present study has objective to explore the relationship of Vietnam financial markets and other financial markets ASEAN. Data and methodology of the research are discussed in the next section.

3. Data and Methodology

This present research focuses on the 2 Vietnam stock markets, the Ho Chi Minh stock exchange and the Hanoi stock exchange and their relationship with stock markets of ASEAN-5. Therefore, data include the closing prices of 7 ASEAN stock indices as described in table 3.1. Weekly data from each index from January 2009 to December 2017 were obtained from Bloomberg.

Table 3.1: Stock Indices

	Country	Index
1	Vietnam	Vietnam Ho Chi Minh Stock Index
2	Vietnam	Vietnam Hanoi Stock Index
3	Indonesia	Jarkata Stock Exchange Composite Index
4	Thailand	Stock Exchange of Thailand Index
5	Malaysia	Bursa Malaysia KLCI
6	Singapore	Straits Time Index
7	Philippines	Philippines Equity Exchange Composite Index

The interconnectedness of the stock markets in the ASEAN-5 and Vietnam was first assessed using the cointegration technique. Cointegration implies long-run relationship between variables and it can be applied to test the linkages between stock markets on the basis that if the markets have become integrated, their respective stock indices would display such relationship. There are two main cointegration tests adopted in this research, namely, the single-equation cointegration test based on the approach of Engle & Granger (1987) and the Johansen system cointegration test as developed by Johansen (1991, 1995).

Prior to these tests, the series were checked with a unit root test to satisfy with basic principle of cointegration that they must be non-stationary. This research utilized the Augmented Dickey-Fuller (ADF) test (Dickey & Fuller, 1979) with the appropriate number of lags determined by Schwarz Information Criterion and it can be concluded that all the 7 stock index series were non-stationary with I(1) process, which is to say they would be stationary after differencing once as required to proceed with the cointegration tests. In addition, this study employed the method of Granger (1969)'s causality to examine the causation between Vietnam stock exchanges, the Ho Chi Minh stock exchange and the Hanoi stock exchange, and the stock market of ASEAN-5.

Since the cointegration test does not imply meaningful causation of the relationship, Granger (1969) causality test answers the question of how much of the current *y* can be explained by the past values of *y* and how much *y* are explained by the past values of *x* (Ajayi, Friedman, & Mehdian, 1998; Azman-Saini, Azali, Habibullah, & Matthews, 2002; Atmadja, 2010; Huyghebaert & Wang, 2010, Puente-Ajovin & Sanso-Navarro, 2015). Thus, *y* is said to be Granger-caused by *x* if the coefficient on lagged *x*'s are statistically significant. Granger causality test involves the estimation of the following equation

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \cdots + \alpha_l y_{t-l} + \beta_1 x_{t-1} + \cdots + \beta_l x_{-l} + \epsilon_t \quad (1)$$

$$x_t = \alpha_0 + \alpha_1 x_{t-1} + \cdots + \alpha_l x_{t-l} + \beta_1 y_{t-1} + \cdots + \beta_l y_{-l} + u_t \quad (2)$$

Granger causality test is based on the null hypothesis that *x* does not Granger causes *y* and *y* does not Granger-caused *x* in the first and the second regression respectively. The results are described for all possible pairs of (*x*,*y*) series in F-statistics and Wald statistics for the joint hypothesis:

$$\beta_1 = \beta_2 = \cdots = \beta_l = 0 \quad (3)$$

4. Results

In order to assess the level of stock market integration in the case of Vietnam and other ASEAN-5 countries, the cointegration tests were conducted. Firstly, the results of bivariate Engle-Granger's single-equation tests between Ho Chi Minh and Hanoi stock exchanges with others in the regions, as well as, the multivariate settings where all is included are reported in Table 4.1 and 4.2. The test can be evaluated based on two statistics: the tau-statistics and the z-statistic. The tables also presented the corresponding p-value of hypothesis testing. From there, the results implied some degree of integration between the Ho Chi Minh stock index with the ASEAN-5 group, particularly, with Indonesia, Malaysia, and Singapore indices were detected.

In contrast, the Hanoi stock index was only found to possibly have a link with Singapore but no statistically significant relationship with the ASEAN-5 group on the whole. This is somewhat expected since the Ho Chi Minh exchange was founded before that in Hanoi and therefore has developed to have more connectivity with others in the region. An alternative set of cointegration results were based on Johansen's system. But first, since the results are rather sensitive to the number of lags included in the estimation, the lag length criteria analysis was considered. Most thresholds, except for the log-likelihood ratio, pointed towards 1 lag as the best specification; hence, the Johansen's cointegration tests will allow up to 1 lagged period.

Table 4.1: Single-equation Cointegration Test between Ho Chi Minh Stock Exchange (HOSE) and Others in ASEAN-5

	tau-statistic	p-value	z-statistic	p-value
HOSE-ID	-1.387833	0.8036	-4.252036	0.7902
ID-HOSE	-3.250386	0.0638 *	-7.773719	0.5106
HOSE-MY	-1.781584	0.6396	-6.078316	0.6439
MY-HOSE	-3.351298	0.0498 **	-9.93728	0.3642
HOSE-PH	-1.340123	0.8191	-4.233797	0.7916
PH-HOSE	-2.221707	0.4135	-5.286561	0.7083
HOSE-SG	-1.61425	0.7167	-5.609546	0.682
SG-HOSE	-3.251288	0.0637 *	-11.89964	0.26
HOSE-TH	-1.504178	0.7617	-5.048616	0.7275
TH-HOSE	-2.521106	0.2718	-6.83357	0.5831
ASEAN5-HOSE	-4.41705	0.1085	-39.38965	0.0748 *

Note: ID = Indonesia, MY = Malaysia, PH = the Philippines, SG = Singapore, TH = Thailand
***, **, * denote level of confidence at 99%, 95%, and 90%, respectively.

Table 4.2: Single-equation Cointegration Test Cointegration between Hanoi Stock Exchange (HNX) and Others in ASEAN-5

	tau-statistic	p-value		z-statistic	p-value
HNX-ID	-1.447449	0.7829		-5.849485	0.6625
ID-HNX	-1.938329	0.5606		-6.261865	0.629
HNX-MY	-0.805405	0.9316		-2.772483	0.8914
MY-HNX	-2.012204	0.5222		-5.250114	0.7112
HNX-PH	-1.292405	0.8335		-4.926556	0.7373
PH-HNX	-1.35513	0.8143		-3.805377	0.8234
HNX-SG	-0.690669	0.9451		-2.351983	0.9144
SG-HNX	-3.123162	0.0858	*	-12.07293	0.252
HNX-TH	-1.135404	0.8741		-4.071881	0.8038
TH-HNX	-1.56847	0.736		-4.053074	0.8052
ASEAN5-HNX	-3.547074	0.4591		-26.95078	0.355

Note: ID = Indonesia, MY = Malaysia, PH = the Philippines, SG = Singapore, TH = Thailand ***, **, * denote level of confidence at 99%, 95%, and 90%, respectively.

The results of Johansen's test can also be assessed with two statistics: the trace and the maximum Eigenvalue statistics. Table 4.3 presented the results of cointegration test of indices of ASEAN-5 markets and the Ho Chi Minh stock exchange and Table 4.4 showed that for the case of Hanoi exchange. Overall, the Ho Chi Minh stock index appeared to have 2 cointegrating relationships with other ASEAN-5 markets based on both statistics, while the tests indicated 2 or 1 cointegrating relationships for Hanoi index, based on either the trace or the maximum Eigen value statistics, respectively. This may imply a relatively stronger linkage with other stock markets in the region from the Ho Chi Minh exchange as compared to the Hanoi exchange, similar to what the previous Engle-Granger test suggested.

Table 4.3: Johansen System Cointegration Test between Ho Chi Minh Stock Exchange (HOSE) and Others in ASEAN-5

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	p-value
None *	0.164161	162.7212	95.75366	0.0000
At most 1 *	0.078717	82.02739	69.81889	0.0039
At most 2	0.036375	45.13262	47.85613	0.0881
At most 3	0.031206	28.45884	29.79707	0.0707
At most 4	0.025993	14.19227	15.49471	0.0778
At most 5	0.005188	2.340594	3.841466	0.1260

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	p-value
None *	0.164161	80.69385	40.07757	0.0000
At most 1 *	0.078717	36.89477	33.87687	0.0211
At most 2	0.036375	16.67378	27.58434	0.6081
At most 3	0.031206	14.26657	21.13162	0.3436
At most 4	0.025993	11.85168	14.26460	0.1163
At most 5	0.005188	2.340594	3.841466	0.1260

Note: ***, **, * denote level of confidence at 99%, 95%, and 90%, respectively.

Finally, the results from cointegration tests may help reveal the degree of interconnectedness between markets but they did not explain the direction of any possible lead-lag relationships among them. The Granger Causality test was, therefore, applied and the results are summarized in Table 4.5. Note that the results based on the Granger Causality test do not imply the direction of causation, rather they indicate whether the changes in the independent variables precede that of the dependent variables. In other words, they would imply that the independent variable series would lead and the dependent variables follow. Here, focusing on the interlinkages between the two Vietnamese exchanges and other markets in ASEAN, it was found that the Ho Chi Minh index tends to shadow that of Malaysia and Singapore, which are understandably the major markets in the region but does not guide any indices. The results for the Hanoi index, on the other hand, were rather counterintuitive. It does not trail any other peers and was, in fact, found to be guiding the Indonesian index. In sum, this can be taken to imply that the two Vietnamese markets are connected to other ASEAN markets to a certain extent.

Table 4.4: Johansen System Cointegration Test between Hanoi Stock Exchange (HNX) and Others in ASEAN-5

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	p-value
None *	0.158814	156.4875	95.75366	0.0000
At most 1 *	0.067693	79.18242	69.81889	0.0074
At most 2	0.045481	47.85093	47.85613	0.0501
At most 3	0.032820	27.04432	29.79707	0.1005
At most 4	0.022858	12.12782	15.49471	0.1509
At most 5	0.004000	1.791500	3.841466	0.1807

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	p-value
None *	0.158814	77.30511	40.07757	0.0000
At most 1	0.067693	31.33148	33.87687	0.0977
At most 2	0.045481	20.80661	27.58434	0.2881
At most 3	0.032820	14.91651	21.13162	0.2948
At most 4	0.022858	10.33632	14.26460	0.1908
At most 5	0.004000	1.791500	3.841466	0.1807

Note: ***, **, * denote level of confidence at 99%, 95%, and 90%, respectively.

Table 4.5: Results from the Granger Causality Test

Variables		**Dependent**						
		MY	ID	PH	SG	TH	HOSE	HNX
Independent	MY	#N/A	*				**	
	ID		#N/A	*		**		
	PH		***	#N/A				
	SG		**		#N/A		**	
	TH		***	*		#N/A		
	HOSE						#N/A	
	HNX		**					#N/A

Note: ID = Indonesia, MY = Malaysia, PH = the Philippines, SG = Singapore, TH = Thailand, HOSE = Ho Chi Minh, HNX = Hanoi
***, **, * denote level of confidence at 99%, 95%, and 90%, respectively.

5. Conclusion

The issue of financial integration has been explored by many researchers because it has several important implications such as diversification benefits to investors holding positions across markets and for policymakers and regulators monitoring the consequences of these developments in terms of capital allocation efficiency, economic growth, as well as, financial stability from adverse contagion effects between countries. Many studies have been conducted based on markets in Southeast Asia. However, virtually all of them focused on the so-called ASEAN-5 which includes Indonesia, Malaysia, Singapore, the Philippines, and Thailand, and very few has considered Vietnam whose significance in the region has grown markedly in recent years. This paper was set out to contribute in that aspect by taking a first look at evidence of interdependence of the two Vietnamese stock markets, namely the Ho Chi Minh and the Hanoi exchanges, with other ASEAN peers.

First, the cointegration techniques of Engle-Granger and Johansen were adopted and they suggested some degree of financial integration among them, with the Ho Chi Minh exchange, being more established, having a relatively stronger tie in comparison to the Hanoi exchange. In addition, the Granger Causality test was also applied to shed light on the possible lead-lag movements among the markets. It was found that the Vietnamese indices are somewhat linked with some other indices in the region.

These results suggested that an integration of Vietnamese and other ASEAN stock markets to be rather limited such that although they are not totally isolated from each other, they are not yet fully integrated either. This is consistent with the results of Kim et al. (20115) that find some degree of interconnections but on a contrary to the findings of Jiang et al. (2017) that Vietnam was not moving along with other ASEAN peers. The implications are that diversification gains may have been reduced but do not completely disappear. Plans of policymakers and regulators to strengthen integration may still be needed to realize further benefits. For instance, initiatives to establish a more harmonized institutional framework, such as governance standards and other best practices, and a trading mechanism that allows for the participation of foreign investors.

To gain a better understanding of the dynamics of Vietnamese market's financial integration with the region, future research could investigate the speed of adjustment towards the common trend using techniques like rolling or recursive cointegration or various convergence measures, or whether integration has helped the markets realized tangible advantages, for instance, asset pricing or capital allocation efficiency and growth. Alternatively, the influence of regional and global factors or even information technology have on the developments could also be studied. Finally, other than stock market linkages, the concept of financial integration can be examined in terms of the movements in interest rate and the bond markets as well.

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