

Financial Development, International Trade, and Stock Market Integration: Evidence in Six Southeastern Asia Countries

Tram Hoang Thuy Bich Nguyen

University of Economics Ho Chi Minh City, Vietnam

Email: nhtbtram@ueh.edu.vn

Anh Huynh Lam

Vietnam Joint Stock Commercial Bank for Industry and Trade, Vietnam

Email: huynhanh.ueh@gmail.com

Abstract

Measuring the integration degree of the national stock market is popular in the general globalization trend. This paper applies the measurement method of Chaiporn et al. (2016) to consider the Vietnamese stock market, and five other typical Asian economies in the period from 2000 to 2015. The authors' method has its foundation in the research of Wälti (2011), An and Zhang (2013) and Dasgupta (2010). The paper adopted the fixed effect and random effect models to measure the impacts of financial development, financial integration and international trade integration to national stock market integration. The research findings revealed the positive affect of financial integration and development on the national stock market's integration with the global stock market in Vietnam and five other countries. In addition the research found international trade integration does not affect the integrating securities market, possibly because the bilateral trade is too small to impact the bilateral stock market's integration.

Keywords: Financial development; financial integration; international trade integration; Southeastern Asia stock markets integration.

1. Introduction

The globalization trend creates a tremendous impetus not only to promote the financial development of a country, but also to open new investment opportunities abroad for international investors to diversify their portfolios and to keep risk management under control. Besides, international trade activities through exchanging goods between countries has been developed in parallel with the growth in transportation, infrastructure and multinational companies as well as human resources. In the general context of the world, the members of the Association of Southeast Asian Nations (ASEAN) have reached the first step towards joining the World Trade Organization (WTO), the free trade agreement (FTA), plus the ASEAN economic community founded in 2015 with important commitment in the trade and non-trade area. These main economic events help ASEAN member countries significantly improve in financial development and bilateral and multilateral trade integration.

Financial development, financial integration, and international trade between countries actually provide many opportunities for economic development. Besides, the countries also need to build a strong and effective financial system that creates economic value and a solid foundation to finance development. Conducting in-depth integration further in all areas in general and the stock market specifically is necessary.

The measurement of the national stock market's integration with global stock markets is a popular topic in the era of globalization. It has been researched in many countries around the world. However, Vietnam - one member country of ASEAN - has still not yet been ap-

proached and studied. On the other hand, the economic situation in the world still has much vulnerability. The regional economic crisis or economic crisis in some countries still doesn't have end markers. Its influence has spread to Vietnam and ASEAN countries in general. It would have a great effect on the securities market in those countries, especially a country under the momentum of increasingly broad and deep integration, as it is easy for Vietnam to be sensitive to the world economy's volatility.

From there, we set out the question as to how to measure the stock market integration, and whether financial development and international trade integration have positive effects on the national stock market integration. With the aim of researching, the paper wants to approach deeply the stock market integration issue of Vietnam and five typical Southeastern Asia economies (Indonesia, Malaysia, the Philippines, Singapore and Thailand) to answer the questions.

2. Literature review

Many authors have studied the influence of financial development and financial integration. Typically, Laeven (2003) used the panel data method for 394 companies in 13 developing countries in the period 1988 - 1998 to estimate the diversified investment portfolio model, and showed that capital market liberalization impacts on each company differently, depending on its scale. Before the events of global financial integration, small-scale companies had been in more difficulty financially than large scale ones. Thanks to the integration events, some barriers to foreign capital flows, which served as a cushion for small companies, were removed. In this situation smaller compa-

nies will access sources of capital better while larger ones will lose the concessional credit package from the integration. So, the authors claim that capital market liberalization will improve this problem, and they show that it is necessary to allocate efficiently and to be fair in financial resources to stimulate growth and create a higher production value for the country.

Umutlu et al. (2010) also considered that the level of financial market liberalization affects the level of fluctuation of stock return by considering the time-varying degree of integration. The author also examines additional factors such as financial openness and the crisis in the region. Then, they provide empirical evidence supporting that the more degree of financial integration increases, the more the level of fluctuation of the overall stock portfolio returns decrease.

A few other studies have also shown that the stock market does not completely integrate between countries and the level of integration is different over time. Typically, Morelli (2010) studied the level of stock market integration in 15 Member States of the European Union in the period 1995-2007. The integration is measured by the multiple element asset-pricing model. The results showed that the level of stock market integration is not complete between the securities markets of the Member States.

In the context of Asian countries, Chambet and Gibson (2008) estimated the level of integration of financial markets by multivariate GARCH models. They evaluated the level of integration and system risk in emerging markets. The authors pointed out that the emerging markets still have not been stable and the level of financial integration has decreased signifi-

cantly during the financial crisis in the 1990s because of the collapse of the stock market. Also, the authors are interested in the relationship between the level of international trade and the financial integration level of a nation. The empirical results showed that a country with a diversified trade structure has a reverse impact on stock market integration.

Some recent studies have related to the level of stock market integration in the globalization trend. For example, Ilyes, Olfa, and Khaled (2014) put more factors relating to global economic integration in 5 South Asian regional markets where 4 are members of ASEAN - Malaysia, Thailand, Singapore, Indonesia. By using the international capital asset pricing model (ICAPM), the authors find that the integration and opening has impacted the level of stock market integration considerably over time and portfolio diversification is increasingly popular and generates significant profits.

Similarly, Aviral et al. (2013) used the cross correlation method to show that the level of stock market integration in 9 countries in Asia is still low, so that there has not been much potential growth of the diversified international portfolio in the long term. On the other hand, Chaiporn et al. (2016) used unbalanced panel data related to financial integration and trade integration in Asian developed and developing countries in the period 1985-2013. Their empirical evidence supports the significant impact of financial integration on stock market integration more than international trade integration.

In terms of the ASEAN region, Reid and Michael (2003) measured the level of stock market integration of 5 countries - Indonesia, Malaysia, the Philippines, Singapore, and Thai-

land after the Asian financial crisis in the period 1998-2002. They collected stock prices return rates daily and weekly. Their results show that these countries are not integrated completely in the post-crisis period. These authors also give advice on integration policy in order to prompt investors to find out the appropriate channel for financial capability, investment needs, and appreciate the opportunity that stock integration brings for high liquidity and low transaction costs. This then would be motivation to integrate stock markets between member countries in the ASEAN region in particular and integrate the global economy more deeply and widely in order to take advantage of the potential opportunities and competitive advantages in the long term.

In general, stock market integration is approached in microeconomic or macroeconomic aspects at a firm level or country level. The range of research has just been stopped in some European and Asian countries. There hasn't been any research to measure stock market integration in Vietnam. In this situation, our paper keeps studying the issue in Vietnam and its familiar trading partner countries such as Indonesia, the Philippines, Malaysia, Thailand and Singapore. These countries are located nearby the East Sea that has an important geographical location for international trade and transportation. Therefore, our paper is expected to provide a big picture for the comparison of stock market integration levels between these countries and consolidates to consider the impacts of financial development and international trade.

3. Method

3.1. Data

The main data sources are the World Bank

(WB), the International Monetary Fund (IMF), Stock Market Quotes and Financial News.

- Some variables such as the level of individual stock market integration with global stock markets (SMI), the level of bilateral stock market integration (BSMI) are calculated from data in Stock Market Quotes & Financial News.
- Financial development (FD), the degree of international trade integration between country *i* and the world (ITI) and the level of bilateral trade exchange (BITI) are from the IMF.
- GDP growth rate (Δ GDP), natural logarithm local currency value compared with the dollar (RETFX), the level of financial integration (FO) and the interest rate spread (INTSPREAD) are from WB. Beside, stock market development variables (SMD1 and SMD2) are measured differently to check the model's robustness. SMD1 is the ratio of domestic firms' market capitalization to GDP. SMD2 is the ratio of trading stock value to GDP. Both of them are also from the WB.

The paper focuses on 6 typical countries in ASEAN such as Vietnam, Indonesia, Malaysia, the Philippines, Singapore, Thailand in the period from January 2000 to December 2015.

3.2. Methodology

The paper examines 3 hypotheses:

H1: the level of financial development (FD) impacts in the same direction the level of stock market integration with global stock markets (SMI).

H2: the level of international trade integration (ITI) impacts in the same direction the lev-

el of stock market integration with global stock markets (SMI).

H3: the level of bilateral international trade integration (BITI) impacts in the same direction the level of bilateral stock market integration (BSMI).

To test the hypotheses H1 and H2, the research based on Chaiporn et al. (2016) models, linear regression is done through the equation:

$$SMI_{i,t} = \alpha_i + \beta_1 FD_{i,t-1} + \beta_2 ITI_{i,t-1} + \sum_{j=2}^n \lambda_j CONTROL_{i,t-1} + \varepsilon_i \quad (1)$$

where:

$SMI_{i,t}$: the level of stock market integration between country i and the global stock market at time t. The index is calculated as follows:

First of all, R-square (R^2) is calculated from the equation:

$$r_{i,k} = \alpha_i + \beta_1 r_{w,k} + \varepsilon_{i,k} \quad (2)$$

The coefficient R^2 shows the dependence of the stock return rate of a country i ($r_{i,k}$) on the international stock return rate ($r_{w,k}$), and the volatility in term of characteristic elements of country i on day k. The daily stock return rate is calculated by first differencing the natural logarithm of stock indicators to estimate the equation (2) for each country. The paper also tests the stability of the model by using monthly stock return rate data instead of daily data in the calculation of the equation (2)

Then, the SMI index is calculated by taking the natural logarithm of the R^2 coefficient from equation (3):

$$SMI_{i,t} = \ln \left(\frac{R^2_{i,t}}{1 - R^2_{i,t}} \right) \quad (3)$$

Daily data are retrieved from Stock Market Quotes, Financial News from 2000 to 2015 in 6 countries corresponding to the stock market index of 6 nations and the MSCI WORLD index - the world stock market index.

$FD_{i,t}$: the level of financial development in country i at time t. FD is calculated by the percentage of domestic credit financed by financial markets on total GDP (%). It measures the level of financial development through the level of banking system development (BSD).

$ITI_{i,t}$: the level of international trade integration in country i with the world at time t. ITI is measured by the percentage of exports and imports on the total GDP (%)

CONTROL is a matrix of variables to control at the national level: Δ GDP, RETFX, INTSPREAD and FO.

Δ GDP: GDP growth rate (%).

RETFX: Exchange rate return (%) is the natural logarithm of the local currency value compared with the dollar. If RETFX is positive, it expresses the currency appreciation of that country.

FO: Financial openness is the level of financial integration directly related to the level of capital market liberalization. It is expressed by the ratio of foreign direct investment (FDI) of GDP (%).

INTSPREAD: Interest rate spread (%) controls the effect of the interest rate disparity between countries. It is calculated by using the interest rate disparity between country i and US money market interest rates. The INTSPREAD will be very small, even 0 if the interest rate of country i is equal to the world interest rate – the US interest rate. The value of INTSPREAD indi-

cates the incomplete domestic financial market integration or no integration with the world financial markets.

ε_t : standard error.

To test the hypothesis H3, the paper measures the integration of bilateral stock market and the integration of bilateral international trade through equation (4):

$$r_{i,k} = \alpha_i + \beta_1 r_{w,k} + \beta_2 r_{j,k} + \varepsilon_{i,k} \quad (4)$$

Where,

$r_{i,k}$: the stock return rate of country i on day k.

$r_{w,k}$: the international stock return rate on day k

$r_{j,k}$: the stock return rate of country j (trading partner country) on day k

$\varepsilon_{p,t}$: standard error.

Then, the degree of integration of the bilateral stock market (BSMI) between countries i and j is calculated through equation (5) with R^2 estimated from equation (4):

$$BSMI_{ij,t} = \ln \left(\frac{R_{ij,t}^2}{1 - R_{ij,t}^2} \right) \quad (5)$$

Similarly to SMI, the paper also tests the stability of the model by using the monthly stock return rate instead of daily data in the calculation of equations (4) and (5).

Finally, the integration of bilateral international trade (BITI) between country i and j is measured by the relative proportions of exports from country i to country j in the total exports of country i, and the relative proportion of imports by country j from country i in the total imports of the country i in year t:

$$EXPORTCON_{ij,t} = \frac{EX_{ij,t}}{EX_{i,t}} \quad (7)$$

$$IMPORTCON_{ij,t} = \frac{IM_{ij,t}}{IM_{i,t}} \quad (8)$$

4. Results

4.1. Descriptive statistics

A total of 96 observations for all variables represent the level of stock market integration, the integration of international trade, development and financial integration. The standard errors of most variables are very small, but SMD1, SMD2, BSD, ITI have high values, which means that the differences in the development of the banking system and foreign trade are relatively large between the 6 countries in the ASEAN region.

The Table 2 presents the results of the analysis correlation between independent variables in order to give an overview of the relationship between variables in the research paper.

SMD1, SMD2, FO and ITI were judged to have significantly high correlation levels, and a few other explanation variables have weak correlation phenomenon. To illustrate the degree of stock market integration with the global stock market, the paper process of graphing R^2 of the equation (2) estimated by daily stock return is in the figure 1.

As we can see, the stock market integration of countries varies over time. Singapore has the highest level of stock market integration in the period from 2000 to 2015. Thailand is also highly integrated with the global stock market from 2006 to 2011. Indonesia has a deeper integration in 2011. These countries become more prosperous after the reform of their financial systems made the stock markets become more attractive for international investors and get a higher integration level. Malaysia's integration seems to be moderate after the Asian financial crisis and comes back better in 2006.

Vietnam has had a low level of stock market

Table 1: The descriptive statistics of variables

Variable	Mean	Median	S.D	Min	Max	Obs.
R2	0.03	0.01	0.04	0.00	0.19	96
R2M	0.22	0.87	0.96	0.00	0.73	96
SMI	-4.95	-4.62	2.25	-13.82	-1.44	96
FO	5.42	3.28	6.52	-2.76	26.52	96
GDP	5.19	5.43	2.48	-2.53	15.24	96
INTSPREAD	4.12	4.26	1.21	1.45	7.68	96
BSD	88.29	81.58	39.57	28.92	173.45	96
RETFX	4.67	3.75	3.62	0.22	9.98	96
SMD1	86.36	64.32	73.92	2.46	299.57	96
SMD2	38.18	22.31	38.85	1.97	211.85	96
ITI	160.20	131.34	107.64	41.94	439.66	96
R2E4	0.17	0.14	0.16	0.00	0.99	96
R2E4M	0.36	0.33	0.22	0.00	0.79	96
BSMI	-2.08	-1.85	1.58	-6.16	5.39	96
BSMIM	-0.82	-0.72	1.31	-6.06	1.33	96
EXPORTCON	1.02	0.23	1.81	0.14	5.78	96
IMPORTCON	0.22	0.23	0.05	0.30	0.30	96

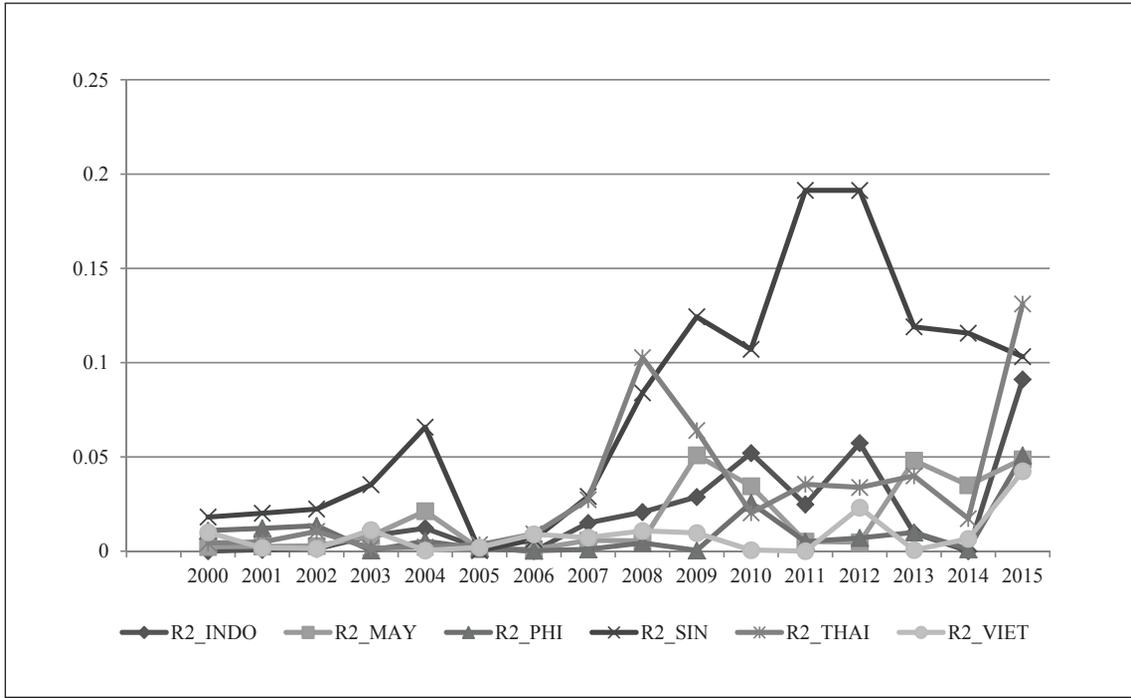
integration for a long time in this six-country research. In spite of joining the WTO since 2007 and being less influenced by the Asian financial crisis, the stock market had not had a breakthrough until 2012. The integration level of the Vietnamese stock market is considerably increased by 50% in 2015 over 2012. Overall, the level of integration of the Vietnamese stock market is not a really stable, deep and broad integration compared with other countries in the region.

4.2. Regression results

4.2.1. The results of testing hypothesis H1 and H2

In model 1, we regress the dependent variable SMI with all its control variables and do not use fixed effects. While the coefficient of interest rate spreads (INTSPREAD) and GDP growth (Δ GDP) has no statistical significance, the coefficient of finance openness (FO) has a significant positive relationship, except for the exchange rate (RETFX). These results show that the higher the level of cross-border finance expansion, the higher the level of the national stock market integration with global stock markets. At the same time, the devaluation of the national currency compared to the U.S. dollar leads to a lower level of integration in the global stock market.

Figure 1: Measuring the degree of stock market integration



Source: Authors' calculation

In model 2, we add the banking systems development variable (BSD). The coefficient has a positive effect and statistical significance, suggesting a higher level of development of the banking industry is related to the national stock market integration with global stock markets. Therefore, the results fully support the hypothesis H1.

In model 3, we add the international trade integration variable (ITI). The coefficient is statistically insignificant. This confirms that the international trade integration is not related to the securities market integration with the global stock market. The conclusion is used to verify the hypothesis.

We include all the variables in model 4. The results still show that the banking sector devel-

opment (BSD) of a country has a positive relationship with the level of the national stock market integration with the global stock market.

Next, the research examines these results by using the fixed effect model in model 5. The results show that the coefficient of BSD is no longer statistically significant. Because the Hausman test suggests a random effects model would be more suitable than the fixed effects model, we continue processing model 6 by using the random effects model. The coefficient of BSD has statistical significance, so that it provides empirical evidence to support the hypothesis H1.

In model 7, we regress with the ITI variable by using a random effects model. The coeffi-

Table 2: Correlation analysis results

	R2	SMI	BSD	SMD1	SMD2	ITI	FO	GDP	INTSPREAD	RETFX
R2	1.000									
SMI	0.659***	1.000								
BSD	0.186**	0.229***	1.000							
SMD1	0.532***	0.397***	0.320***	1.000						
SMD2	0.469***	0.410***	0.319***	0.848***	1.000					
ITI	0.461***	0.338***	0.257***	0.805***	0.829***	1.000				
FO	0.493***	0.372***	0.089	0.751***	0.753***	0.865***	1.000			
GDP	-0.157**	-0.048**	-0.198**	0.105	0.097**	0.097	0.237***	1.000		
INTSPREAD	0.255***	0.178**	-0.347***	0.041	0.149**	0.054	0.156**	-0.002	1.000	
RETFX	-0.342***	-0.368***	-0.457**	-0.801***	-0.683***	-0.635***	-0.448**	0.095	0.060**	1.000

Table 3: OLS regression results for equation (1) with SMI dependent variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	No fixed effects	No fixed effects	No fixed effects	No fixed effects	Country-and year-fixed effects	Random effects	Random effects	Random effects
Constant	-5.426***	-6.999***	-5.905***	-7.094***	-4.623***	-6.999***	-5.905***	-7.094***
FO _{t-1}	0.092**	0.084**	0.033	0.058	-0.016	0.084***	0.033	0.058
ΔGDP _{t-1}	-0.087	-0.077	-0.074	-0.071	-0.056	-0.077	-0.074	-0.071
INTSPREAD _{t-1}	0.045	0.195	0.058	0.198	-0.169	0.195	0.078	0.199
RETFX _{t-1}	-6.146*	-5.336	-5.522	-5.115	-4.954	-5.336	-5.522	-5.115
BSD _{t-1}		0.011*		0.010*	0.007	0.011*		0.010*
ITI _{t-1}			0.004	0.002			0.004	0.002
Adjusted R ²	0.1071	0.1347	0.1077	0.1264	0.3168	0.0114	0.0073	0.0088
F-statistics	3.67***	3.77***	3.15***	3.15***	1.66***	18.85***	15.74***	18.87***
Countries	6	6	6	6	6	6	6	6
Observations	90	90	90	90	90	90	90	90

Table 4: OLS regression results for equation (1) with dependent variable SMIM

	(1) No fixed effects	(2) Country-and year- fixed effects	(3) Random effects	(4) Random effects	(5) Random effects
Constant	-2.952***	-4.066***	-4.974***	-3.422***	-5.097***
FO _{t-1}	0.101***	0.055	0.094***	0.051	0.072
ΔGDP _{t-1}	-0.038	-0.026	-0.030	-0.029	-0.026
INTSPREAD _{t-1}	0.191	0.411	0.376**	0.221	0.382**
RETFX _{t-1}	-0.000*	0.000	-0.000	-0.000	-0.000
BSD _{t-1}		-0.003	0.014**		0.013**
ITI _{t-1}				0.003	0.001
Adjusted R ²	0.1373	0.2216	0.991	0.7866	0.9882
F-statistics	4.54***	0.48	24.01***	18.82***	23.89***
Countries	6	6	6	6	6
Observations	90	90	90	90	90

cient of the ITI is not statistically significant, that shows the integration of international trade does not affect the stock market integration.

Model 8 is full of variables, including the main variables and the control variables. The results point out that financial development measured by BSD has a positive effect on the stock market integration but international trade integration ITI does not affect the stock market integration.

To check the consistency of regression results with SMI, the paper uses SMIM – monthly stock return rate instead of SMI – the daily stock return rate to solve the potential impact of the difference between trading time in Asia and the America stock markets. The correlation between SMI and the SMIM is 0.441 with the p-value smaller than 0.01. Similar to the regression of variables as above, the estimated results are presented in Table 4.

Overall, the results in Table 4 are statistically similar to Table 3. This leads to the conclu-

sion: the impact of financial development on the stock market integration is statistically positive, in the meantime, the impact of international trade integration on the stock market integration does not have statistical significance. In summary, the results of empirical research only support hypothesis H1.

4.2.2. The results of regression testing hypotheses H3

To test hypotheses H3, we estimate the OLS panel data model with bilateral stock market integration (BSMI). As the IMPORTCON variable has a high correlation with the EXPORTCON variable ($r = 0.02$, $p\text{-value} < 0.001$), we conduct two variables in the separate model to avoid multicollinearity. As the Hausman test suggests, a fixed effects model is more suitable than a random effects model

The coefficients of the IMPORTCON variable in model 1, model 3 and the EXPORTCON variable in model 2 and model 4 are of no statistical significance. They show that the

Table 5: OLS regression results for equation (1) with dependent variables BSMI, BSMIM

	(1) BSMI	(2) BSMI	(3) BSMIM	(4) BSMIM
Constant	-4.243***	-1.398*	-3.565***	-0.491
IMPORTCON _{t-1}	10.184		12.728	
EXPORTCON _{t-1}		-0.607		-0.282
Country-fixed effects	Yes	Yes	Yes	Yes
Period-fixed effects	Yes	Yes	Yes	Yes
Adjusted R ²	0.1660	0.7809	0.1328	0.4920
F-statistics	7.74**	1.09***	12.13***	0.22
Countries	6	6	6	6
Observations	96	96	96	96

level of bilateral international integration of imports and exports does not affect the level of bilateral integration of stock markets. Overall, the results in Table 5 show the disagreement with the view that the level of bilateral trade integration affects the stock market integration. These results are the same as Kawai (2005) who states that the level of mutual economic depen-

dence in Asian countries has increased in the past 10 years and their bilateral integration in commodities may not be enough to impact the level of bilateral integration of stock markets.

4.2.3. Robustness check

We conduct a robustness check by using the financial market development variables – SMD1 and SMD2 instead of FD. In Table 6, we

Table 6: Robustness check for hypothesis H1

	(1) Random effects	(2) Random effects	(3) Random effects	(4) Random effects
Constant	-6.254***	-5.720***	-6.124***	-5.309***
FO _{t-1}	-0.015	-0.015	0.001	0.022
ΔGDP _{t-1}	-0.085	-0.070	-0.090	-0.070
INTSPREAD _{t-1}	0.114	0.027	0.106	0.005
RETFX _{t-1}	-3.190	-3.590	-3.246	-0.000
SMD1 _{t-1}	0.013***		0.014***	
SMD2 _{t-1}		0.024***		0.026**
ITI _{t-1}			-0.002	-0.003
Adjusted R ²	0.0688	0.0274	0.0719	0.0274
F-statistics	25.55***	24.67***	25.41***	24.96***
Countries	6	6	6	6
Observations	90	90	90	90

present the regression results, which are similar to the results in Table 6, with the dependent variable SMI stock market integration.

In models 1 and 3, the coefficient SMD1 and SMD2 are positive and have a statistical significance of 1%. This indicates that the level of financial development measured by the rate of the market capitalization of domestic companies on the total GDP (SMD1) and the change in financial development indicated by the ratio of the value of securities traded on the total GDP (SMD2) impact the stock market integration. The results provide evidence for the hypothesis H1 that financial development of a country has positive effects on the integration of the nation's stock market with the global stock market.

5. Conclusions

The paper uses the data of Vietnam and five other ASEAN countries in the period 2000-2015 to research into the impact of financial development and international trade integration on the level of stock market integration. The research findings are as follows:

Firstly, at the highest level of financial development, integration will lead to a high degree of integration of the national stock market with the global stock market; at the same time the devaluation of the national currency will result in lower levels of integration in global stock markets. If the level of development of the banking industry is also as high as possible that will create a driving force for the integration of the national stock market with global stock markets.

Secondly, international trade integration is not related to the integration of the securities market with global stock markets, and the level of bilateral integration in commodities may not be enough to impact the bilateral integration level of the stock market.

Therefore, the conclusions of this paper are consistent with previous studies supporting the view that the level of financial market integration is mainly caused by international capital flows rather than by international trade integration.

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