Scholars Journal of Economics, Business and Management e-ISSN 2348-5302
Sch J Econ Bus Manag, 2017; 4(8B):541-547 p-ISSN 2348-8875

(An International Publisher for Academic and Scientific Resources) **DOI:** 10.36347/sjebm.2017.v04i08.011

The Impacts of Liquidity on Stock Market Development in ASEAN – 5: A Traditional Panel Analysis

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Abstract: In this paper, the impacts of liquidity on stock market development in ASEAN – 5 countries are examined. By utilizing the traditional panel estimation comprise of available data from 1990 – 2014,), results of estimation from Fixed Effect Model (FEM) and Random Effects Model (REM) suggested that liquidity is a significant determinant on stock market development in ASEAN – 5. In choosing the most appropriate model, Hausman Test results confirms that REM is more appropriate to be applied. The analysis results also signify that gross domestic product (*GDP)* and total saving (*SAV)* are statistically significant at five percent confidence level.
Keywords: Stock market development, Liquidity, ASEAN, panel analysis

INTRODUCTION

Stock market plays an important role in fostering the economy of a country. It have been well – stated that stock market allow the allocation of resources in a productive ways through investments [1], reduce the transaction and information costs [2] and provide more available funds for investment [4]. Also, stock market alleviate the liquidity risk and allow for risk sharing. Given this, most of the investors would prefer to invest into a stock market which have a higher stock market liquidity[1] particularly for the long term investment. Besides, another determinants such as.

As more investors are attracted to invest into a stock market, it would stimulate the process of Stock market development (SMD)[2]. Moreover, due to the fact that any aggressive changes in the stock market could give a significant implication to the economy [3], stock market should be continuously develop. Thus, more capital inflows are needed to narrow the development gap between the counterparts in the region. Given this, more trading volume which related to stock market liquidity is vitally important to ensure the capital inflows which also represent the attractiveness of the stock market.

However, there are some evidences which show the debatable impacts of stock market liquidity on stock market development (SMD). For instance, study by Calderon – Rossell (1991) denotes level of *SMD* was captured by the output growth and stock market liquidity. It was supported by Bencivenga *et al.* [6] which states that stock market liquidity position could reduce the investment risks and costs in a projects which attract more investors into the market. Moreover, a liquid stock market could secure the access of the stocks during the project implementation. This is due to the fact that the stock traded can easily and quickly be sold without any substantial effects on the price. Therefore, a liquid stock market will encourage more long term investment by the investors through a profitable projects which then improve the capital allocation and long term growth of a stock market [5].

Nevertheless, Levine [2] argued that the stock market liquidity could determine the *SMD*. This is because, although any long term investments need a long term commitment in term of capital, investors do not prefer to lose their control of the saving or capital for a long periods. Furthermore, study by Bernstein [7] examined the effect of stock market liquidity to the *SMD* and found that stock market liquidity and efficiency are not compatible to each other. This is due to the reason that a new information to liquid market will keep minimal noise and price changes. On the other hand,

[1]Stock market liquidity is defined as the easiness of trading the stocks without substantially affect the price and low cost (Amihud & Mendelson, 1986; Chordia *et al.*, 2005; Datar, 2000)

[2]*SMD* is defined as the process of improving the ability of the stock market to satisfy the need of the traders and enhancing the long term investment through a higher stock market liquidity position which suggested by El-Wassal [8], Nowbutsing and Odit [18], Sezgin and Atakan [19] and Balogun *et al.* [20].

price moves faster in an efficient market upon arrival of new information. Thus, stock market liquidity would lead to a less efficient market.

Moreover, although studies on effects of stock market liquidity and *SMD* are quite numerous, least studies have been conducted in emerging markets especially the ASEAN – 5 region as most of the studies were particularly focus on the developed economies such as the United States (US) and United Kingdom (UK). This could possibly cause to selection bias with respect to the emerging regions due to the data scarcity and time depth. The implications of such circumstances is that, the findings of those studies are not applicable to the emerging markets grounded on the economic structure and policy differences. To describe the relationship between stock market liquidity and *SMD* in ASEAN – 5, the trend of trading volume[3] and market capitalization to gross domestic product (*MCAP*)[4] in ASEAN – 5 are illustrated in Figure 1.

Generally, there is no harmonious pattern between stock market liquidity and *MCAP* were illustrated for all ASEAN – 5 countries except for Philippines. Also, all ASEAN – 5 countries were affected by the AFC in 1997 – 1998 and the US financial crisis in 2008. During these period, contrast pattern between stock market liquidity and *MCAP* were prevailed rooted from the emerging illiquidity shock. Thus, many investors attempted to replace illiquid risky securities with liquid alternatives since the illiquid stocks would have significant impacts on the investors' portfolio allocation (Charoenwong, Ding, & Yang, 2012; Nsofor, 2016).

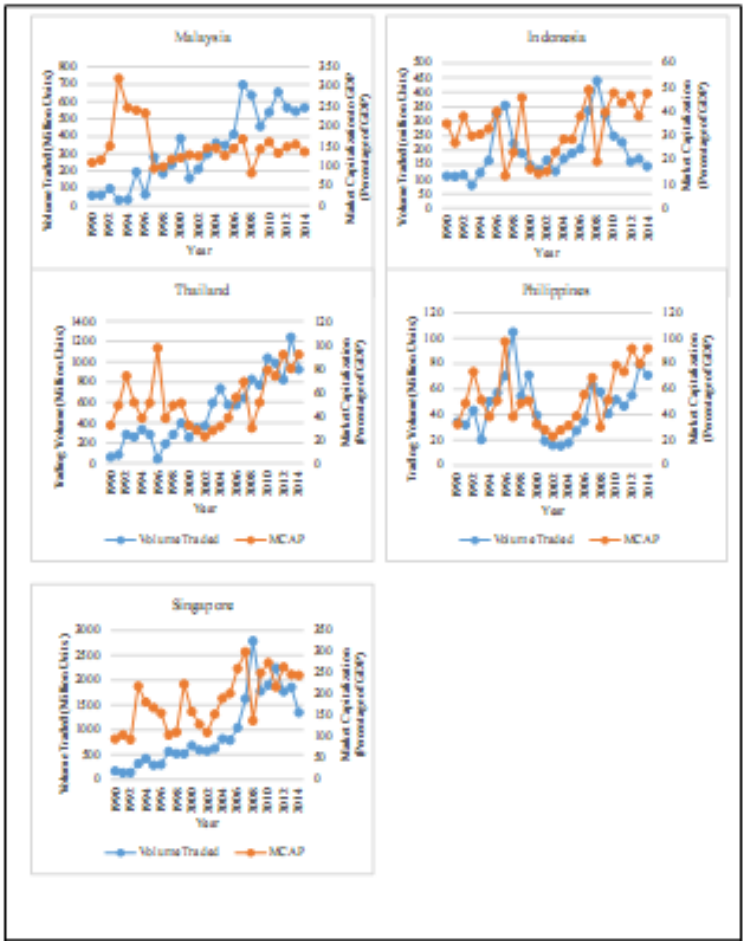

Fig-1: Trend of SMD and Stock Market Liquidity, 1990 – 2014

[3] Trading volume has also applied by Augusto, Forti and Yen-tsang [21], Chipaumire and Ngirande [9], Demirgui-kunt and Levine [24], Hegde and Paliwal [22], Naceur, Ghazouani, and Omran [23], Sezgin and Atakan [19].

[4]

Moreover, originated by the subprime crisis in the US trigger to inevitable drops in both contents which mainly influenced by significant contagion effects (Chunxiu & Masih, 2014). Due to this event, investors speculate for further drop in the global stock market which then affect the trading activities particularly in the emerging markets. This study contributes to the body of knowledge by filling the gaps on the ambiguous effects of stock market liquidity on *SMD* by focusing in the ASEAN – 5 region. To further investigate the relationship between stock market liquidity and *SMD*, next sections provide the methodology, results interpretation and closed by policy implication and summary.

METHODOLOGY

In accomplishing the objective, the traditional panel analyses which include the Fixed Effects Model (FEM) and Random Effects Model (REM) are employed. Besides stock market liquidity, the other determinants of *SMD* are also considered in the model. Such determinants are Gross Domestic Product (*GDP*) which represents the economic growth of the country, Total Saving (*SAV*) is the portion of disposable income which deposited in the financial institutions, Inflation Rate (*INF*) denotes the general rising in price level of goods and services which cause falling in purchasing power of the consumers, Interest Rate (*INT*) signifies the monetary policy which related to the cost of borrowing by financial institutions. Total Credit to Private Sector (*CRT*) indicates the financial resources provided by the financial institutions and banks to the private sector in financing their projects or investment and Dummy (*D*) notify the Asian Financial Crisis period which is 1990 – 1996 as pre – crisis and 1997 – 2014 as post crisis period.

The first estimation model applied in this paper is the FEM which also called the least – square dummy variable (LSDV) estimator. The FEM allow different constant for each country over time (Asterion & Hall, 2007; Baltagi, 2008). Given this, FEM would consider the factors such as geographical, managerial style, managerial philosophy, natural endowments, types of market and any other factors which make the countries are vary.. As for this paper, the FEM is given by the Equation (1).

$$SMD_{it} = \alpha_i + \beta_1 GDP_{it} + \beta_2 SAV_{it} + \beta_3 INF_{it} + \beta_4 INT_{it} + \beta_5 CRT_{it} + \beta_6 DUM_{it} + \varepsilon_{it} \quad (1)$$

where β is the coefficient value for each variable in country *i* and year *t*. The error term is denoted *as* ε . The ε is random unobserved component that reflects unobserved shocks which assumed to be independent, has a constant variance (σ_ε^2) and zero mean for all firms for all time periods. The term α_i refers to the intercept parameter that varies across countries and not over time. It will captured the individual heterogeneity and treated as fixed effect.

The second estimation model is REM. It handles the constants for each group random parameters instead of fixed. Thus, the variability of the constant for each entity comes to the fact that $\alpha_i = \alpha + \nu_i$ where ν_i has a zero mean, $E(\nu_i) = 0$; constant variance, $var(\nu_i) = \sigma_\nu^2$;uncorrelated across country, $\mathrm{cov}(\nu_i, \nu_j) = 0, i \neq j$. The term ν_i also known as unobservable or latent variable which treated as random effects. In this paper, the REM is given by Equation (2).

$$SMD_{it} = \alpha_i + \beta_8 LIQ_{it} + \beta_9 GDP_{it} + \beta_{10} SAV_{it} + \beta_{11} INF_{it} + \beta_{12} INT_{it} + \beta_{13} CRT_{it} + \beta_{14} DUM + \nu_i + \varepsilon_{it} \quad (2)$$

where the intercept parameter, α_i is assumed to be constant and uncorrelated with each explanatory variable in all time periods. The term ν_i is the cross – section error component while ε_{it} is the combined time series and cross – section error component which also called idiosyncratic term. The combination of ν_i and ε_{it} is known as composite error term or error component model which denoted as μ_{it} . The assumptions under REM are given by Equation (3) – Equation (7)

$$\nu_i \sim N(0, \sigma_\nu^2); \quad (3)$$

$$\varepsilon_i \sim N(0, \sigma_\varepsilon^2); \quad (4)$$

$$E(\nu_i \varepsilon_{it}) = 0; E(\nu_i \nu_j) = 0, \quad i \neq j; \quad (5)$$

$$cov(\varepsilon_{it}, \varepsilon_{js}) = E(\varepsilon_{it}, \varepsilon_{js}) = E(\varepsilon_{it}, \varepsilon_{is}) = E(\varepsilon_{ii}, \varepsilon_{ij}) = 0, \quad i \neq j; t \neq s; \tag{6}$$

$$cov(\varepsilon_i, X_{it}) = 0; \tag{7}$$

given these, the individual μ_{it} are uncorrelated over cross – section and time – series unit. Also, it is not correlated with any explanatory variables included in the model. Thus, the assumptions stated in Equation (3) – Equation (7) follows another assumptions given in the Equation (8) – Equation (11)

$$E(\mu_{it}) = E(\nu_i + \varepsilon_{it}) = E(\nu_i) + E(\varepsilon_{it}) = 0 \tag{8}$$

$$var(\mu_{it}) = var(\nu_i + \varepsilon_{it}) = var(\nu_i) + var(\varepsilon_{it}) + 2cov(\nu_i, \varepsilon_{it}) = \sigma_\nu^2 + \sigma_\varepsilon^2 \tag{9}$$

$$cov(\mu_{it}, \mu_{jt}) = E(\mu_{it}, \mu_{js}) = 0 \ (i \neq j; t \neq s) \tag{10}$$

$$cov(\mu_{it}, \mu_{is}) = \sigma_\mu^2 \tag{11}$$

Although the error term is homoscedastic which shows by Equation (10), the error term at two different times μ_{it} and μ_{is} $(t \neq s)$ are correlated for a given cross –sectional unit.

To choose the most appropriate models between FEM and REM, the Hausman Test is conducted. The null hypothesis (H_0) for this test states that REM is consistent and efficient while the alternate hypothesis (H_1) is REM is inconsistent as the FEM will be always consistent. The statistic of estimator is tested using the Hausman Test in Equation (12).

$$H = \left(\hat{\eta}^{FE} - \hat{\eta}^{RE}\right)' \left[\text{var}\left(\hat{\eta}^{FE}\right) - \text{var}\left(\hat{\eta}^{RE}\right)\right]^{-1} \left(\hat{\eta}^{FE} - \hat{\eta}^{RE}\right) \sim \chi^2(k) \tag{12}$$

where $\hat{\eta}$ is the estimated parameter, *RE* and *FE* is random effect and fixed effect, respectively. If the value of the statistic is large, then the difference between the estimated is significant. Thus, H_0 will be rejected and FEM should be considered.

DISCUSSION OF RESULTS

The analysis results for FEM are reported in Table 1. Based on the results, the coefficient value for stock market liquidity is found to be statistically significant at five percent confidence level. Thus, any increase in 1.0 million units of stock market liquidity would stimulate 2.34 percent of *SMD* in ASEAN – 5. As the FEM assumes that there is no different between the cross – country and time variant, any increase in 1.0 million unit of stock market liquidity would boost 2.34 percent of *SMD* for all countries in ASEAN – 5. The fixed effects for all countries are given as 72.83, -64.33, -32.51, -55.43 and 79.44 for Malaysia, Indonesia, Thailand, Philippines and Singapore, respectively.

Results also signifies that, explanatory variables within the FEM explains 73 percent of the variation in the *SMD* of ASEAN – 5's for the 1990 – 2014. In addition, the *F*-statistic value of 27.45 percent specifies that there is a strong evidence of the joint statistical influence between the variables in the model at the five percent significance level.

The next traditional panel analysis is REM which assumes that the constants for each country has a random parameter instead of fixed. The estimation results are reported in Table 2. Results disclose that coefficient value for stock market liquidity is also significantly different from zero at ten percent confidence level. Any increase in 1.0 billion unit of stock market liquidity would boost 4.67 percent of *SMD* in ASEAN – 5. The common constant for REM based on the above results is 58.79. As the REM considered the composite error terms, the cross – section or individual specific error term (μ_i) is given by 49.15 and the idiosyncratic term (ε_{it}) is 43.73.

Table 1: Results of Fixed Effects Model (Dependent Variable: SMD)

Variable	**Coefficient**	**Std. Error**	***t*-Stat**	**Prob.**
C	66.69	22.20	3.00	0.00*
LIQ	2.34	1.45	1.61	0.04*
GDP	-13.08	7.74	-1.69	0.09**
INT	0.65	1.06	0.61	0.54
INF	0.65	0.96	0.67	0.50
SAV	68.38	26.24	2.61	0.01*
CRT	0.13	0.24	0.56	0.58
DUM	3.41	9.36	0.36	0.72
Fixed Effects (Cross)				
Malaysia			72.83	
Indonesia			-64.33	
Thailand			-32.51	
Philippines			-55.43	
Singapore			79.44	
Statistics				
R-squared	0.73	Mean dependent var		97.53
Adjusted R-squared	0.70	S.D. dependent var		74.09
S.E. of regression	40.50	Akaike info criterion		10.33
Sum squared resid	185342.90	Schwarz criterion		10.60
Log likelihood	-633.72	Hannan-Quinn criter.		10.44
F-statistic	27.45	Durbin-Watson stat		1.29
Prob(F-statistic)	0.00			

Note: * and ** indicate significant at the 5 and 10 percent significance levels, respectively

Table 2: Results of Random Effects Model (Dependent Variable: SMD)

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	58.79	31.98	1.84	0.07**
LIQ	4.67	1.65	2.83	0.08**
GDP	-13.61	8.11	-1.68	0.04*
INT	0.14	1.12	0.12	0.90
INF	0.17	1.01	0.17	0.87
SAV	67.71	27.53	2.46	0.02*
CRT	0.32	0.23	1.38	0.17
DUM	3.99	10.09	0.40	0.69
Random Effects (Cross)				
Malaysia			60.89	
Indonesia			-50.31	
Thailand			-37.20	
Philippines			-44.20	
Singapore			70.82	
Effects Specification				
		S.D.	Rho	
Cross-section random (ν_i)		49.15	0.56	
Idiosyncratic random (ε_{it})		43.73	0.44	
Weighted Statistics				
R-squared	0.77	Mean dependent var	17.09	
Adjusted R-squared	0.73	S.D. dependent var	42.86	
S.E. of regression	41.22	Sum squared resid	198765.70	
F-statistic	2.44	Durbin-Watson stat	1.19	
Prob(F-statistic)	0.02			
Unweighted Statistics				
R-squared	0.56	Mean dependent var	97.53	
Sum squared resid	575131.3	Durbin-Watson stat	0.41	

Note: * and ** indicate significant at the 5 and 10 percent significance levels, respectively.

On the overall goodness of the model, 73 percent of the variation in the *SMD* of ASEAN – 5 can be explained by explanatory variables within the REM. In addition, the *F*-statistic value of 2.44 percent indicates that, at the five percent significance level, there is a strong evidence of the joint statistical influence between the variables in the model.

Based on the Hausman Test results reported in Table 3, the associated *p*-value indicates that, there is a failure to reject the null hypothesis. Therefore, the REM is more appropriate to be employed than the FEM. The analysis from this part also reveal that, *GDP* and *SAV* are statistically significant at five percent confidence level.

Table 3: Results of the Hausman Test

Variable	**Fixed**	**Random**	**Var(Diff.)**
LIQ	2.34	4.67	-0.52
GDP	-13.08	-13.61	-5.76
INT	0.65	0.14	-0.14
INF	0.65	0.17	-0.10
SAV	68.38	67.71	-69.80
CRT	0.13	0.32	0.00
DUM	3.41	3.99	-14.37
Test Summary	**Chi-Sq. tatistic**	**Chi-Sq. d.f.**	***p* – *v*alue**
Cross-section random	0.00	7	1.00

Results obtained was supported by the model proposed by Calderon – Rossell (1991) and El – Wassal [8] which found a significant relationship between stock market liquidity and *SMD*. They proposed that the number of listed company in a particular stock market is determined by the liquidity position. This circumstances show that, higher liquidity would convince an investor to consider for a risk – premium. As a liquid stock market provides a quick and easy access to the stocks traded. Also, investors would consider to invest into a particular stock market as their investment decision regarding the withdrawal of the stocks would not give a substantial effects on the stock prices [9].

Vagias and Dijk [10] suggested that the stock market liquidity in ASEAN – 5 are provided by the foreign investors. Due to the prudential monetary policies implemented and supports obtained by IMF, ASEAN – 5 remained to be attractive for the foreign investors. Therefore, foreign investors would provide instead of consume the stock market liquidity. Moreover, based on the studies by Amihud and Mendelson [11], Brogaard, Li, and Xia [12], Fernando [13] and Yang and Hamori [14], the stock market liquidity would disclose the economic position in a country. Also, a liquid stock market would provide an information of a safer market for investment which would attract more investors and concurrently boost the stock market development. It was also supported by Kyle (1985), Bogdan *et al.* [15], Chordia *et al*. [16] and Dalsenius [17].

POLICY IMPLICATION AND CONCLUSION

Findings in this paper proposed several policy implications for ASEAN – 5 stock markets. Firstly, as stock market liquidity could stimulate the *SMD*, a well – functioning trading procedures including clearing, settlement systems, corporate governance and transparency of the trading information is necessary. As a result, it would enable them to handle a high trading volume of transaction and help to stimulate the *SMD*. Secondly, policymakers should concern on the banking policy as it play a driving force in promoting the *SMD*. Lastly, an institutional framework should be formulated in facing any financial crisis as it could tailor the *SMD* in ASEAN – 5.

As this paper try to examine the relationship stock market liquidity and *SMD* in ASEAN – 5 countries. The utilization of available data from 1990 – 2014 suggested that the estimation using REM is more appropriate based on the Hausman Test result. The estimation results shows that stock market liquidity is an important determinant of *SMD* in ASEAN – 5 and this study propose that the application of time series would also worth in the future attempts. Also, the inclusion of all ASEAN countries are also recommended prior to the data availability as it would also allow for a comparative assessment.

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