The Volatility of Equity Flows in ASEAN Emerging Markets

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ความผันผวนของการเคลื่อนย้ายเงินทุนในตลาดหุ้นเกิดใหม่ในภูมิภาคอาเซียน

น.ส.สุภัชญา เกตุจันทร์

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาเศรษฐศาสตรมหาบัณฑิต
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สุภัชญา เกตุจันทร์ : ความผันผวนของการเคลื่อนย้ายเงินทุนในตลาดหุ้นเกิดใหม่ในภูมิภาคอาเซียน. (The Volatility of Equity Flows in ASEAN Emerging Markets) อ.ที่ปรึกษาหลัก : ผศ. ดร.ยอง ยูน

ความผันผวนของเงินลงทุนในตลาดหุ้นเกิดใหม่ในภูมิภาคอาเซียนเป็นผลมาจากการลดความผ่อนคลายนโยบายการเงินของธนาคารกลางในประเทศอุตสาหกรรมหลักโดยเฉพาะการขึ้นอัตราดอกเบี้ยนโยบายของธนาคารกลางของประเทศสหรัฐอเมริกาส่งผลให้เงินลงทุนในตลาดหุ้นเกิดใหม่ในภูมิภาคอาเซียนมีความผันผวนมากขึ้นโดยเงินทุนเริ่มทยอยไหลออกจากกลุ่มประเทศตลาดเกิดใหม่กลับไปยังกลุ่มประเทศอุตสาหกรรมหลัก ขณะเดียวกันการเปิดเสรีทางการเงินของภูมิภาคอาเซียนทำให้ระบบเศรษฐกิจต้องเผชิญกับความผันผวนมากขึ้น โดยใช้ DCC-MGARCH model ในการหาความผันผวนและทิศทางความผันผวนระหว่างตลาดและใช้ SUR model ในการศึกษาปัจจัยที่ส่งผลต่อความผันผวนของเงินลงทุนในตลาดหุ้นเกิดใหม่ในภูมิภาคอาเซียน ประกอบด้วยปัจจัยภายนอกและปัจจัยภายในประเทศ

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The volatility of foreign equity flows into and out of ASEAN emerging markets is a source of concerned for macroeconomic and financial stability. This thesis uses the DCC-MGARCH model examine the volatility co-movement of daily net foreign equity flows for four ASEAN emerging economies (Thailand, Malaysia, Indonesia and the Phillipines) from 1st October 2009 to 28th December 2018. Furthermore, the SUR model is employed to understand which global and domestic macroeconomics factors may affect the volatility of net foreign equity flows. Overall, we find a slowdown of net equity flows to these ASEAN emerging markets especially since 2015 with the normalization of US monetary policy.

Field of Study: Economics Student's Signature .....

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CHAPTER 1: INTRODUCTION

1.1 Introduction of capital flows volatility

The capital flows volatility in emerging market have risen of concern about financial stability and macroeconomic. The capital flows have been subject to volatility driven by extremely monetary policies in advanced economies. The Economic problem started in 2007 with the US housing bubble continuous to mortgage subprime. A high default rates and extensive dispersion of credit risk effect to the world economy. The bankruptcy of financial institutions became a collapse of the world financial system and fell into an economic recession. The US federal reserves have continuously declined interest rates almost zero percent to keep their economic stability and using a quantitative easing policy for stimulated economy and increasing the money supply.

The concept behind quantitative easing was to inject more liquidity into the financial system. The monetary expansion in the US was increasing in capital flows to their economy and creating spillover effects to the ASEAN emerging markets. Including to a globalized and borderless economy that no limited boundary for capital mobility. A rapid surge in net capital flows to ASEAN emerging markets because a higher interest rate in ASEAN emerging markets attracted investors turned their attention to the high yields from the lower interest rate in advanced economies.

Since 2015 the US economic recovery the US federal reserve has focused on returning to a more normalized monetary policy as expectation of the end of quantitative easing by rising interest rates back above their near-zero rate. The capital flows to ASEAN emerging markets slowdown and stops then become a sudden reversal in the direction of capital flows. The capital flows to the ASEAN emerging markets have been volatile since then. There was a volatile in capital flows to ASEAN emerging market since then.

The capital flows volatility to the emerging markets become a source of concern about financial stability. A major concern of policymakers in ASEAN emerging

markets is about the volatility of capital flows especially short-term flows such as equity flows which change abruptly. To understand the correlations between markets are important as information for governments, businesses, and investors. This is a challenge for policymakers in emerging countries to achieve their macroeconomic policy to response uncertainty factors and to manage the capital flows volatility.

The capital flows to the emerging markets are driven by a set of factors grouped into three categories consist of global uncertainty factors, domestic macroeconomics factors, and domestic structural factors. The global factors consist of the US real federal fund rate, the 10-years US Treasury bond yield, the US inflation, global risk aversion represented by VIX index, price of oil. The domestic macroeconomics consists of the domestic policy rate, domestic inflation. The domestic structural factors consist of the international reserve exchange rate regime.

All of this leads to the research question: How do the global factors and domestic factors affect the volatility of net equity flows in Asia emerging markets and are there a co-movement between countries within the region.

1.2 Objective

To identify what factors affect the volatility of equity flows in ASEAN emerging markets and to identify the co-movement of the equity flows volatility between countries within the region.

1.3 Scope

This paper study about three categories of factors consists of global uncertainty factors, domestic macroeconomic factors, and domestic structural factors effects on the volatility of equity flows to the ASEAN emerging markets. Focuses on four countries in the ASEAN consist of Indonesia, Malaysia, The Philippines, and Thailand by using data started from 2009 to 2018.

1.4 Expected Benefits

- Policymakers can achieve their macroeconomic policy to response push factors or pull factors that drive volatility of equity flows by using a domestic factor to manage the volatility of equity flows.
- Investors can use as information for investment diversification or hedging to response uncertainty factors or notice when the equity flows are volatile.

CHAPTER 2: LITERATURE REVIEW

The capital flows volatility happens for all advanced or emerging market economies. Including portfolio debt and equity flows. The capital flows except FDI flows have low persistence for all economies but in emerging market economies is not much different persistence in different types of flows. Bluedorn, Duttagupta et al. (2013) Portfolio flows in countries at an intermediate level of financial development tend to be more volatile.

Global factors consist of US interest rate, US inflation, S&P stock index and world growth are important factors that drive the volatility of flows. However, economic stability can help reduce portfolio flows volatility. Broto, Diaz-Cassou et al. (2008) The impact of domestic financial factors on portfolio flows are different from the other type of flows. Broto, Díaz-Cassou et al. (2011) The global financing conditions affect temporary tides of capital flows. Lower interest rates and risk aversion will increase the flows of foreign investment and reverse when they are high. For emerging markets, net flows are largely driven by foreign investors.

Bluedorn, Duttagupta et al. (2013) In recent year Hannan (2017) the capital flows slowdown cause a lower growth to combine with worse global risk settlement. Both push and pull factors are the dominant drivers of capital flows. Pull factors are less important than push factors in explaining capital flow volatility. Pagliari and Hannan (2017) The sensitivity of flows depend on push factors and pull factors both episode of low and high capital flows. The difference between long term and short term US bond yield is significant in a period of high episodes while not significant during normal time. The volatility of international short-term capital flows consists of equity investment and debt inflows in emerging markets' effect on economic growth.

Short-term flows to emerging markets with financial fundamental weakness can bring about to economic crashes, financial crisis, macroeconomic imbalances, and raise financial stability risks. Mukharaev (2017) Equity fund flows increases the volatility in Asian emerging stock markets. Macroeconomic factors like GDP growth and money

supply increasing more fund flows and decreasing the volatility of the stock market but inflation, budget deficit, and unemployment will increase outflows and market volatility. Qureshi, Kutan et al. (2017) The market volatility has a positively related with net local equity flows but has a negative relationship with net equity flows from a foreigner. However, there is no effect from equity flows to market volatility and market return. Goh, Meinn et al. (2017)

Emerging markets dealing with the high volatility of net capital flows. Aizenman and Pasricha (2013) Global uncertainty is the dominant key in driving short-term portfolio flow volatility. Ananchotikul and Zhang (2014) Indicators like global risk aversion and different policy rates between advanced economies and emerging markets and growth are important drivers of net capital flows to the emerging markets and determinants of portfolio net inflows. After the global financial crisis period capital flows sensitive to interest rate differential imply the monetary policy in the US has an effect on net inflows to the emerging markets. Ahmed and Zlate (2014) Global uncertainty is a key role in explaining the extremely capital flows period by foreign and local investors as decreasing in capital flows by local investors and sudden stops in capital flows by a foreigner. Forbes and Warnock (2012) The countries characteristic that rely on more international funds are more sensitive to push factors. Cerutti, Claessens et al. (2017)

The US market creating a spillover to other markets. The push factors include factors determining the supply of the global liquidity surges resulting from easing monetary and fiscal policies. Dutta (2018) Global risk aversion creating a spillover effect depends on the country's characteristics. The country with more managed currencies has less sensitive to global risk aversion. Ananchotikul and Zhang (2014) Portfolio flow shocks are a temporary effect on the financial market. Increasing portfolio inflows lead to an appreciation of the exchange rate. The exchange rate absorbs the impact of portfolio flows. Hwa, Raghavan et al. (2016)

The global and domestic factors play temporary driver Malaysia's net portfolio flows. Higher global liquidity increases net portfolio flows and higher global risk

aversion decreases net portfolio flows. Hwa, Raghavan et al. (2017) The result from the Dynamic Conditional Correlation (DCC) Multivariate GARCH model shows that global uncertainty has a significant impact on asset price volatility. This impact depends on macroeconomic fundamentals such as inflation and the current account balance along with financial openness, the exchange rate regime. Ananchotikul and Zhang (2014) Bala and Takimoto (2017) recommend the DCC-MGARCH-with-skewed-t is suited to capture the effect of return volatility spillovers in emerging markets.

Most developing countries have liberalized their capital account transactions, removed restrictions on foreign ownership it less barrier for the foreign investors to access their markets. Increasing foreign equity flows is a part of the allocation of global savings that reach to higher investment and growth. Policymakers have been concerned about foreign investment reach to the instability of macroeconomic. Claessens (1995)

The foreign capital inflows increase the efficiency in the financial market reach to improved asset allocation. Foreign equity flows are the key of external financing for developing countries. The foreign equity flows are short-term flows and related to volatility movement form the foreign investors searching for short-term capital gain by active equity transaction. Kim and Rajapakse (2001) There is a significant correlation between the investment of foreign equity and short-term market dynamics. Chai-Anant and Ho (2008) In general equity flows are less than bond flows but it's rather volatile. Edison and Warnock (2008) The foreign equity inflows are a channel that affects financial and real economic activity such as countries' productivity, investment, and growth. Hoggarth, Jung et al. (2018) The openness to portfolio flows affects economic growth. Ferreira and Laux (2009) The equity market around the world have been volatile because of the spillover effect from volatility in the US market and the Japanese market rather than a spillover from the European stock market. Kearney (2000) Bond flows are less sensitive to US interest rates and US industrial activity than equity flows. The US interest rate and US industrial production are a negative impact on flows. Chuhan, Claessens et al. (1998)

Macroeconomic fundamentals in each market are a pull factor of net foreign flows. The foreign investors respond in different markets but also have correlated between markets. The Philippines shows only modest correlations with Thailand and no significant correlation appears between Indonesia and other markets**.** There is a cross-market co-movement of net flows it means foreign investors investing in or out of several Asian markets in the same period. Chai-Anant and Ho (2008) The correlation coefficients of several country pairs became statistically significant during the Asian financial crisis. Increasing volatility spillover or crisis contagion in the period of the Asian financial crisis. The volatility spillover became significant during the Asian financial crisis when comparing Indonesia with other countries such as Malaysia and the Philippines. Besides those that already had a significant correlation coefficient to the Asian financial crisis. Increasing the correlation coefficients even further after the crisis. Nevertheless, the correlation coefficients of some country pairs remained weak and insignificant even during the Asian crisis period, for instance, there was no significant correlation between Singapore and other Asian countries. Chantapacdepong (2017)

The volatility spillover is a channel of risk transmission that affects the covariance of equity and bond structural. Aboura and Chevallier (2014) There is no spillover from financial shock in the US to Asia markets but Hong Kong which a market leader of the region creating a spillover to other markets. Manopimoke, Prukumpai et al. (2018) The asset volatility transmission to another by a channel of conditional variance channel directly and indirect channel through conditional covariance. Katusiime (2019)

The liberalization of ASEAN emerging markets creating opportunities for portfolio diversification cross-market by foreign investors. Lower interest rates in advanced economies increasing portfolio flows to ASEAN as the fourth largest trading region in the world. Free trade area and no trade barrier in ASEAN attract foreign investment. After the financial crisis, the integration and interdependence between ASEAN countries increasing. L.K. (2007) The ASEAN markets are interdependence with the US and Japan. Each market has differently interrelated with the US and Japan such as Indonesia’s independencies relative to the US and Japan. Malaysia’s dependencies

from Japan than the US. Thailand's independencies from the US but also depend on Japan. Philippines independencies from the US than Japan Majid, Meera et al. (2008)

In 2013 the Federal Reserve started a quantitative easing program that leads to the appreciation of the dollar against home currencies in Asia emerging countries. The weakness fundamental such as high inflation, current deficit and diminishing economic growth caused by capital outflows out of Indonesia. The volatility spillover was driven by macroeconomic fundamentals as a weak financial economic. After the global financial crisis period, the correlation of volatility in the international stock market surged and decreased rapidly but the volatility remained. In the recent year, Asian markets have been a net received of uncertainty shock spillover from advanced countries imply that Asia emerging markets are not completely integrated to global.

The limitation of co-movement in the stock market is a result of interdependent financial policy. The ASEAN stock markets become more integrated but still, need for policy linkage to relieve the effect of financial fluctuations from the interdependencies stock markets. Sharma and Wongbangpo (2002) The ASEAN stock market have a highly integrated level since before the ASEAN trading link founded. The interdependent of short-term in ASEAN stock markets was temporary and diminishing to the previous volatility level after approximately 1–2 years. Jiang, Nie et al. (2017) The completely stock market integration has not occurred in ASEAN regional cooperation. The obvious instruments that created like ASEAN trading link do not have more power to increase our interdependence dramatically. Increasing market development of the lower is the important booster for stock market integration. Boonbandanrit (2015)

CHAPTER 3: CONCEPTUAL FRAMEWORK

This paper study about three categories of factors consist of global uncertainty factor, domestic macroeconomic factors, and domestic structural effect on the volatility of equity flows to the ASEAN emerging market.

3.1 Global uncertainty factors

The US monetary policy is a global factor that changes in US monetary policy drive the risky asset prices as a pushing factor capital toward the emerging markets. The global factors consist of the US real federal fund rate, the 10-years US Treasury bond yield to represent global interest rate conditions. The US inflation and the US industrial production index to reflect the growth of world GDP to measure global growth and global liquidity. The global risk aversion represented by the VIX index to measure risk appetite driven by economic uncertainties, price of oil to represent community prices.

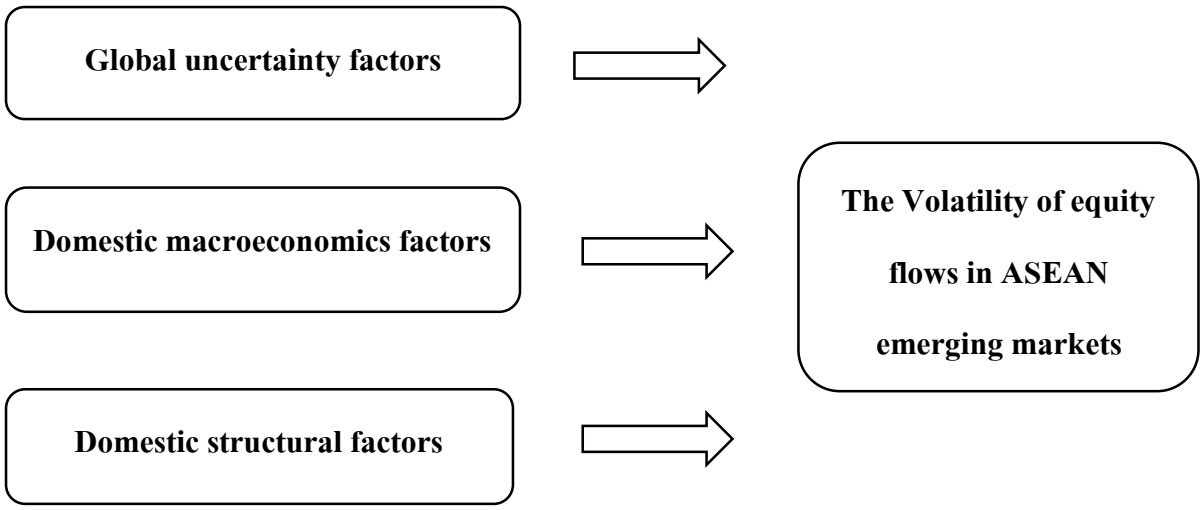
3.2 Domestic macroeconomics factors

The volatility of net equity flows also related to the domestic macroeconomic factors as pull factors drawing capital from abroad. The domestic macroeconomics consists of the domestic policy rate to capture economic stability. Domestic inflation to capture the quality of macroeconomic policy and domestic industrial production index to reflect the growth of each country.

3.3 Domestic structural factors

The capital flows also sensitive to the domestic structural factors as pull factors drawing flows from abroad. The domestic structural factors consist of international reserve, exchange rate regime for capture a weakness to the balance of payment crisis.

Figure 1: Conceptual framework



CHAPTER 4: DATA AND METHODOLOGY

This study using the dynamic conditional correlations multivariate GARCH (DCC-MGARCH) for predicts volatility of time series and allows relationship between the volatility of net equity flows cross-market capturing co-movement between market and using seemingly unrelated regression (SUR) to observe the global uncertainty factors, domestic macroeconomic factors, and domestic structural factors impact on the volatility of equity flows.

4.1 The dynamic conditional correlations multivariate GARCH (DCC-MGARCH)

The DCC-MGARCH model proposed by Engle and Sheppard in 2001. The idea of this model is created from the modeling of conditional variances and correlations.

The DCC-MGARCH model is defined as:

$$r_t = \mu_t + a_t$$

$$a_t + H_t^{1/2} z_t$$

$$H_t = D_t R_t D_t$$

The idea of the DCC-MGARCH model is the covariance matrix H_t can be decomposed into conditional standard deviation D_t and a correlation matrix R_t. In this model both D_t and R_t are designed to be time-varying.

Where

r_t is $n * 1$ vector of net equity flows of n countries at time t

μ_t is $n * 1$ vector of the expected value of the conditional r_t

a_t is $n * 1$ vector of mean-corrected return of n assets at time t

H_t is $n * n$ matrix of conditional variances of a_t at time t

$H_t^{1/2}$ is any $n * n$ matrix at time t

D_t is $n * n$ diagonal matrix of conditional standard deviations of a_t at time t

R_t is $n * n$ conditional correlation matrix of ϕ_t at time t

z_t is $n * i$ vector of iid errors.

The elements in the diagonal matrix D_t are standard deviations is defined as:

$$D_t = \begin{bmatrix} \sqrt{h_{1t}} & \cdots & 0 \\ \vdots & \ddots & \vdots \\ 0 & \cdots & \sqrt{h_{nt}} \end{bmatrix}$$

Where

$$h_{it} = \alpha_{i0} + \sum_{q=1}^{Q_i} \alpha_{iq}\, \alpha_{i,t-q}^2 + \sum_{p=1}^{Pi} \beta_{ip}\, h_{i,t-p}$$

Since R_t is a correlation matrix it is symmetric.

$$R_t = \begin{bmatrix} 1 & \cdots & \rho_{1n,t} \\ \vdots & \ddots & \vdots \\ \rho_{1n,t} & \cdots & 1 \end{bmatrix}$$

The elements of $H_t = D_t R_t D_t$ is:

$$|H_t|_{ij} = \sqrt{h_{it} h_{jt}}\rho_{ij}$$

Where $\rho_{ii} = 1$

R_t is decomposed into:

$$R_t = Q_t^{*-1} Q_t Q_t^{*-1}$$

$$Q_t = (1 - a - b)\overline{Q} + a\epsilon_{t-1}\epsilon_{t-1}^T + bQ_{t-1}$$

Where $\overline{Q} = Cov[\epsilon_t\epsilon_t^T] = E[\epsilon_t\epsilon_t^T]$

$\overline{Q}$ can be estimated as :

$$\overline{Q} = \frac{1}{T}\sum_{t=1}^{T} \epsilon_t \epsilon_t^T$$

Q_t^* is a diagonal matrix with the square root of the diagonal elements of Q_t at the diagonal:

$$Q_t^* = \begin{bmatrix} \sqrt{q_{11t}} & \cdots & 0 \\ \vdots & \ddots & \vdots \\ 0 & \cdots & \sqrt{q_{nnt}} \end{bmatrix}$$

To guarantee $H_t$is positive definite, a and b must satisfy:

$$a \geq 0, b \geq 0 \text{ and } a + b < 1$$

The DCC(M,N)-GARCH model is defined as:

$$Q_t = \left(1 - \sum_{m=1}^{M} a_m - \sum_{n=1}^{N} b_n\right)\overline{Q}_t + \sum_{m=1}^{M} a_m \phi_{t-1}\phi_{t-1}^T + \sum_{n=1}^{N} b_n Q_{t-1}$$

4.2 The seemingly unrelated regressions (SUR)

The seeming unrelated regressions model was introduced by Arnold Zellner in 1962 is a combination of several regression equations to linear regression. Each equation has its dependent variable and different sets of exogenous variables and can be estimated separately but the assumption of error terms are correlated across the equations.

The SUR model comprising of M multiple regression equations of from:

$$y_{ti} = \sum_{j=1}^{k_i} x_{tij}\,\beta_{ij} + \varepsilon_{ti}\,, t = 1,2,\dots,T; i = 1,2,\dots,M; j = 1,2,\dots k_i$$

Where

y_{ti} is the t^{th}observation on the t^{th}dependent variable which is to be explained by the t^{th}regression equation.

x_{tij} is the t^{th}observation on j^{th}explanatory variable appearing in the i^{th}equation.

β_{ij} is the coefficient associated with x_{tij} at each observation.

ε_{ti} is the t^{th}value of the random error component associated with t^{th}equation of the model.

These M equations can be compactly expressed as:

$$y_i = X_i\beta_i + \varepsilon_i\,, i = 1,2,\dots,M$$

Where

y_i is $(T * 1)$ vector with elements y_{ti}

X_i is $(T * K_i)$ matrix whose column represent the T observations on an explanatory variable in the i^{th}equation.

β_i is a $(K_i * 1)$ vector with elements β_{ij}

ε_i is a $(T * 1)$ vector of disturbances.

These M equation can be further expressed as:

$$\begin{bmatrix} y_1 \\ \vdots \\ y_M \end{bmatrix} = \begin{bmatrix} X_1 & \cdots & 0 \\ \vdots & \ddots & \vdots \\ 0 & \cdots & X_M \end{bmatrix} \begin{bmatrix} \beta_1 \\ \vdots \\ \beta_M \end{bmatrix} + \begin{bmatrix} \varepsilon_1 \\ \vdots \\ \varepsilon_M \end{bmatrix}$$

Or

$$y = X\beta + \varepsilon$$

Where

The order of y is $(TM * 1), X$ is $(TM * k^*), \beta$ is $(k^* * 1), \varepsilon$ is $(TM * 1)$ and $k^* = \sum k_i$

Treat each of the M equations as the classical regression model.

The assumptions for $i = 1,2, \dots, M$ are:

X_i is fixed.

Rank$(X_1) = k_i$

$\lim_{T\to\infty} \left(\frac{1}{T} X_i' X_i\right) = Q_{ii}$ where Q_{ii} is nonsingular with fixed and finite elements.

$E(u_i) = 0$

$E(u_i u_i') = \sigma_{ij} I_T; i, j = 1,2, \dots, M$

Where

Q_{ii} is non-singular matrix with fixed and finite elements

σ_{ij} is the covariance between the disturbance of i^{th} and j^{th} equations for each observation in the sample.

The SUR model is defined as:

$$E(\varepsilon) = 0$$

$$E(\varepsilon\varepsilon') = \begin{bmatrix} \sigma_{11} I_T & \cdots & \sigma_{1M} I_T \\ \vdots & \ddots & \vdots \\ \sigma_{M1} I_T & \cdots & \sigma_{MM} I_T \end{bmatrix} = \sum \otimes I_T = \Psi$$

Where

$\otimes$ denotes the matrix Kronecker product.

Ψ is $(\mathrm{MT} * \mathrm{MT})$ matrix.

$\sum = (\sigma_{ij})$ is $(\mathrm{M} * \mathrm{M})$ positive definite symmetric matrix.

The definiteness of $\sum$ avoid the possibility of linear dependencies among the contemporaneous disturbances in the M equations of model.

4.3. Data

This study using daily foreign net equity flows divided by stock market capitalization for each country focus on four countries consist of Indonesia, Malaysia, The Philippines, and Thailand. The observation starts from 1st October 2009 to 28th December 2018. Table 1 presents the four emerging stock markets in Asian. Table 2 presents data and sources of data.

Table 1: Stock markets variables

Country	Stock Markets
Indonesia	Jakarta stock exchange
Malaysia	FTSE Bursa Malaysia
The Philippines	Philippines stock exchange
Thailand	Stock exchange of Thailand

Table 2: Data and source

Variables	Frequency	Source
Net foreign equity flows	daily	Bloomberg
Stock market capitalization	daily	Bloomberg
The US real federal fund rate	Monthly	Bloomberg
10-years US Treasury bond yield	Monthly	Bloomberg
The US industrial production index	Monthly	CEIC Database

Variables	Frequency	Source
The US inflation	Monthly	Bloomberg
VIX	Monthly	Bloomberg
Oil price	Monthly	Bloomberg
Domestic policy rate	Monthly	CEIC Database
Domestic inflation	Monthly	CEIC Database
Domestic industrial production index	Monthly	CEIC Database
International reserve	Monthly	CEIC Database
Exchange rate	Monthly	CEIC Database

CHAPTER 5: EMPIRICAL RESULT

From a technical point of view, this study extends in two steps. First, this study finds that net foreign equity flows have volatile for each country and cross-market correlation appear captured by the DCC-MGARCH(1,1) model with the ARCH and GARCH effects have a statistically significant in all four countries and their correlations.

Figure 2: Daily net foreign equity flows in Indonesia

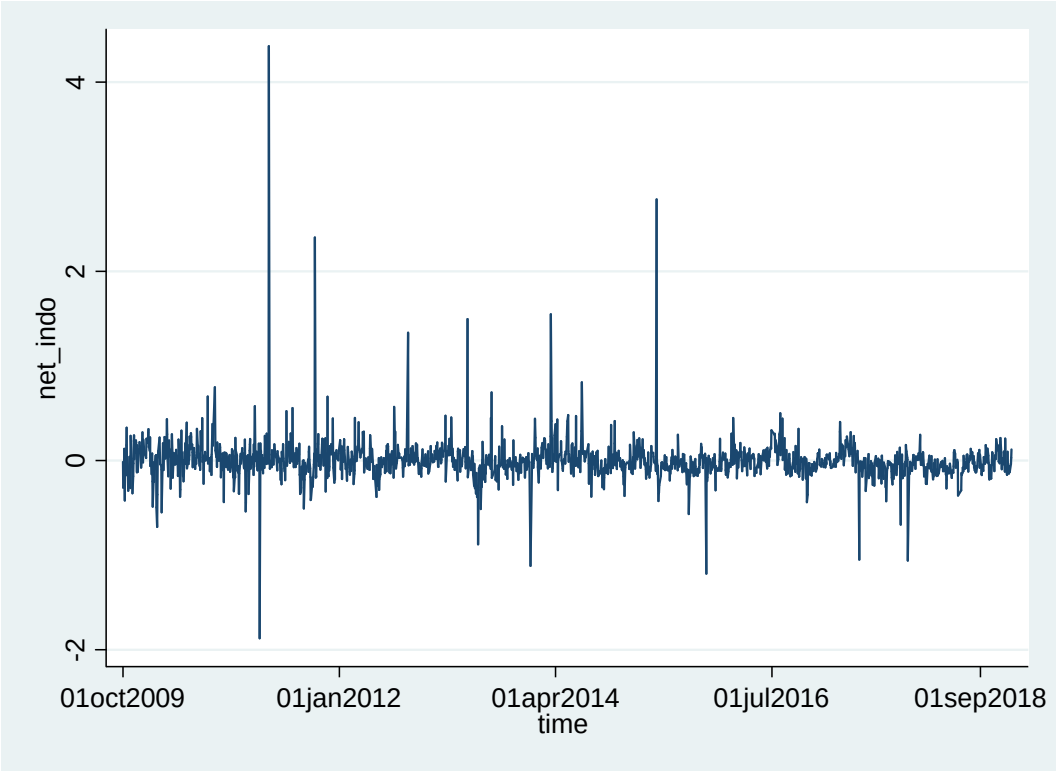


Figure 3: Daily net foreign equity flows in Malaysia

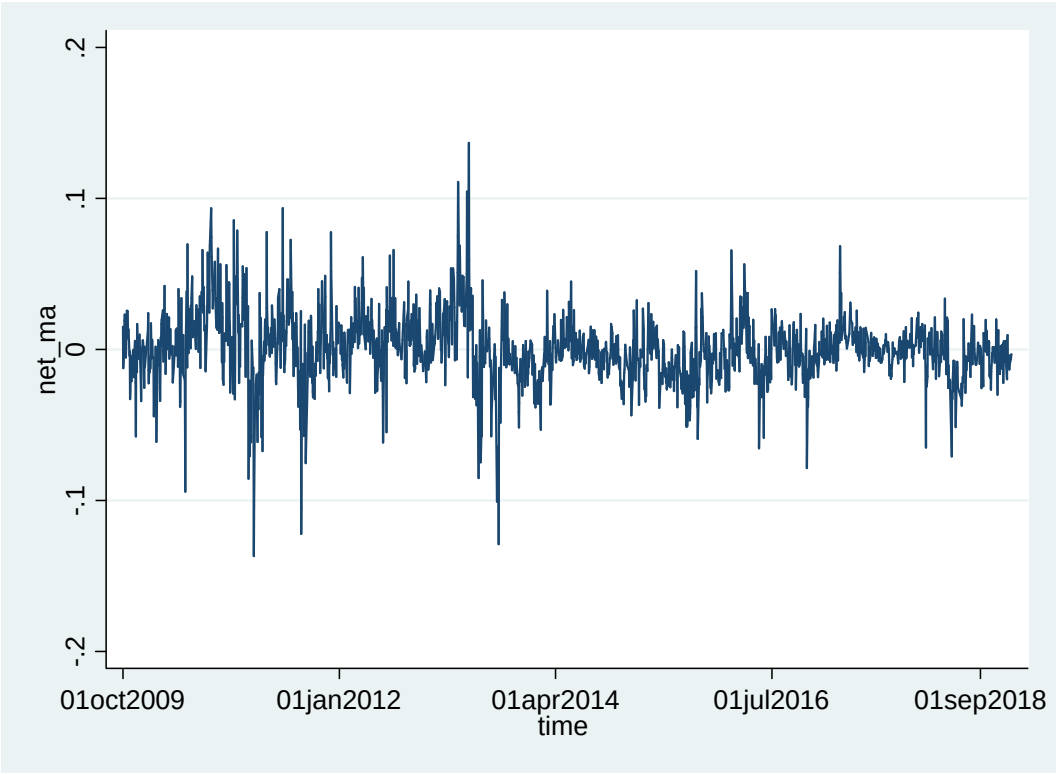


Figure 4: Daily net foreign equity flows in the Philippines

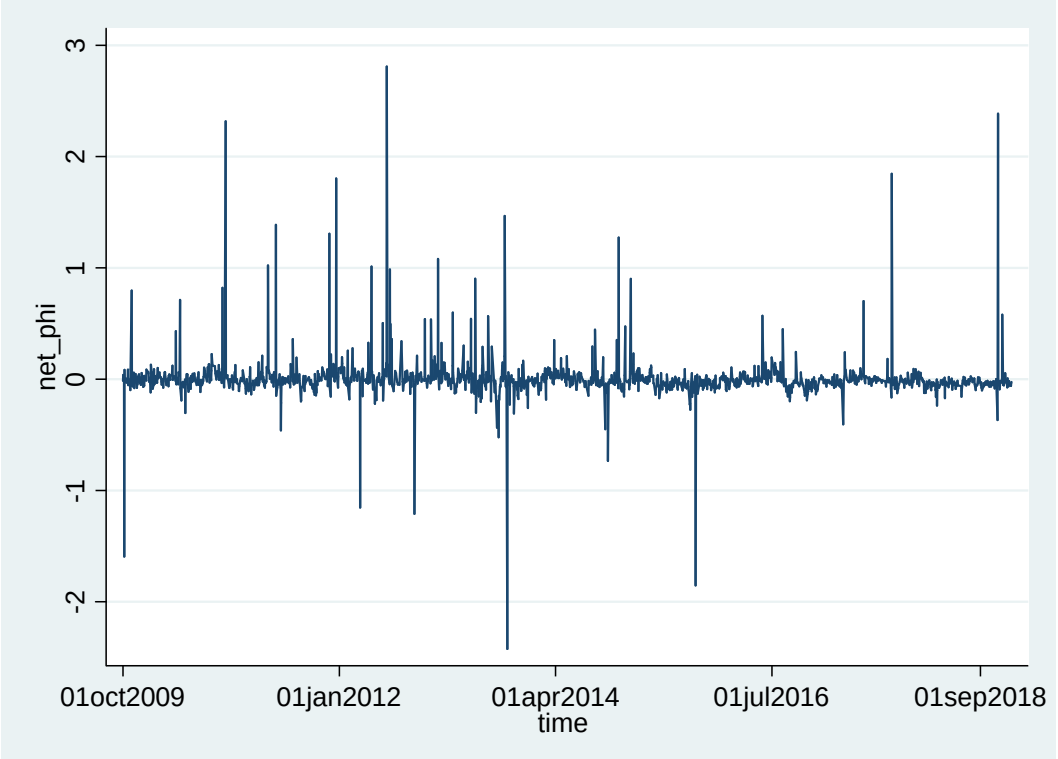


Figure 5: Daily net foreign equity flows in Thailand

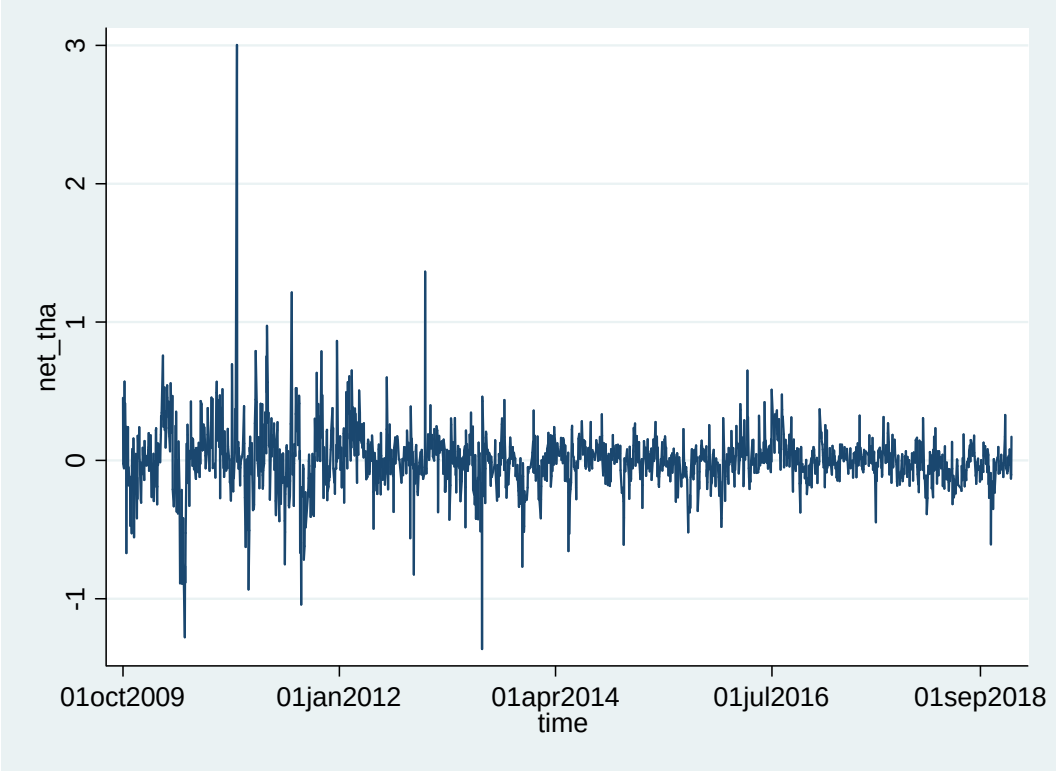


Table 3: Results of the DCC-MGARCH model

	Coef.	Std. Err.	z	P>| z |	[95% Conf. Interval]	
net_indo						
_cons	.0001066	.0050176	0.02	0.983	-.0097278	.0099409
ARCH_net_indo						
arch L1.	-.0021723	.0001404	-15.48	0.000	-.0024474	-.0018973
garch L1.	.8804736	.0417876	21.07	0.000	.7985714	.9623758
_cons	.0053455	.001839	2.91	0.004	.0017412	.0089498
net_tha						
_cons	-.0008312	.0046029	-0.18	0.857	-.0098527	.0081903
ARCH_net_tha						

arch	.0831611	.0167022	4.98	0.000	.0504254	.1158968
L1.	.91401	.0176396	51.82	0.000	.8794371	.9485829
garch						
L1.	.000519	.0002056	2.53	0.012	.0001162	.0009219
_cons						
net_ma						
_cons	-.0008304	.0004488	-1.85	0.064	-.00171	.0000492
ARCH_net_ma						
arch	.2043602	.043645	4.68	0.000	.1188174	.2899029
L1.						
garch	.7684092	.0533392	14.41	0.000	.6638664	.8729521
L1.	.0000176	7.31e-06	2.41	0.016	3.28e-06	.0000319
_cons						
net_phi						
_cons	-.0134219	.0061956	-2.17	0.030	-.025565	-.0012788
ARCH_net_phi						
arch	1.050407	.2536878	4.14	0.000	.5531882	1.547626
L1.						
garch	.0046383	.0010926	-4.25	0.000	-.0067797	-.0024969
L1.	.0296145	.0013384	22.13	0.000	.0269913	.0322378
_cons						
corr(net_indo,net_tha)	.1689193	.024852	6.80	0.000	.1202102	.2176284
corr(net_indo,net_ma)	.1944025	.024237	8.02	0.000	.1468989	.2419061
corr(net_indo,net_phi)	.0772821	.0253462	3.05	0.002	.0276045	.1269598
corr(net_tha,net_ma)	.2829764	.024136	11.72	0.000	.2356707	.330282
corr(net_tha,net_phi)	.0920134	.0255176	3.61	0.000	.0419998	.1420271
corr(net_ma,net_phi)	.1058634	.0256209	4.13	0.000	.0556473	.1560794
Adjustment						
lambda1	.1060592.3	.0168746	6.29	0.000	.0729856	.1391327
lambda2	227006	.0883154	3.65	0.000	.1496057	.4957956

Table 4: Correlations of daily net foreign equity flows

	Indonesia	Malaysia	Thailand	The Philippines
Indonesia	1	.1944025	.1689193	.0772821
Malaysia	.1944025	1	.2829764	.1058634
Thailand	.1689193	.2829764	1	.0920134
The Philippines	.0772821	.0920134	.1058634	1

The result in table 3: shows ARCH and GARCH effects have a statistically significant in all four countries means that net foreign equity flows have volatile for each country and show a significant positive correlation in all four markets. The correlation that implies the cross-market co-movement of net foreign equity flows. Within the region, the net foreign equity flows have a positive sign its mean net equity flows in each market are not independent in direction.

Table 4: presents the average of the dynamic correlation of net foreign equity flows to ASEAN emerging markets consist of Indonesia, Malaysia, Thailand, and the Philippines. The range of correlation is between to which correlation value close to or indicates a strong positive or negative relationship. The significant positive correlation meaning that net foreign equity flows are the same moving in the direction. The net foreign equity flows to Malaysia and Thailand have the highest value of conditional correlation at 0.2829764 which means they have the strongest relationship in the region. The ASEAN correlations are positive but rather low with net foreign equity flows to Thailand and the Philippines at 0.0920134 and the lowest conditional correlation is between net foreign equity flows to Indonesia and the Philippines at 0.0772821.

The strong interdependence between net foreign equity flows to the ASEAN emerging markets implies that net foreign equity flows in ASEAN are moving together especially during a period of economics shock means that the similarity of the whole region to crash or boom together is highly considerable.

Figure 6: Correlations of daily net foreign equity flows between Malaysia and Indonesia

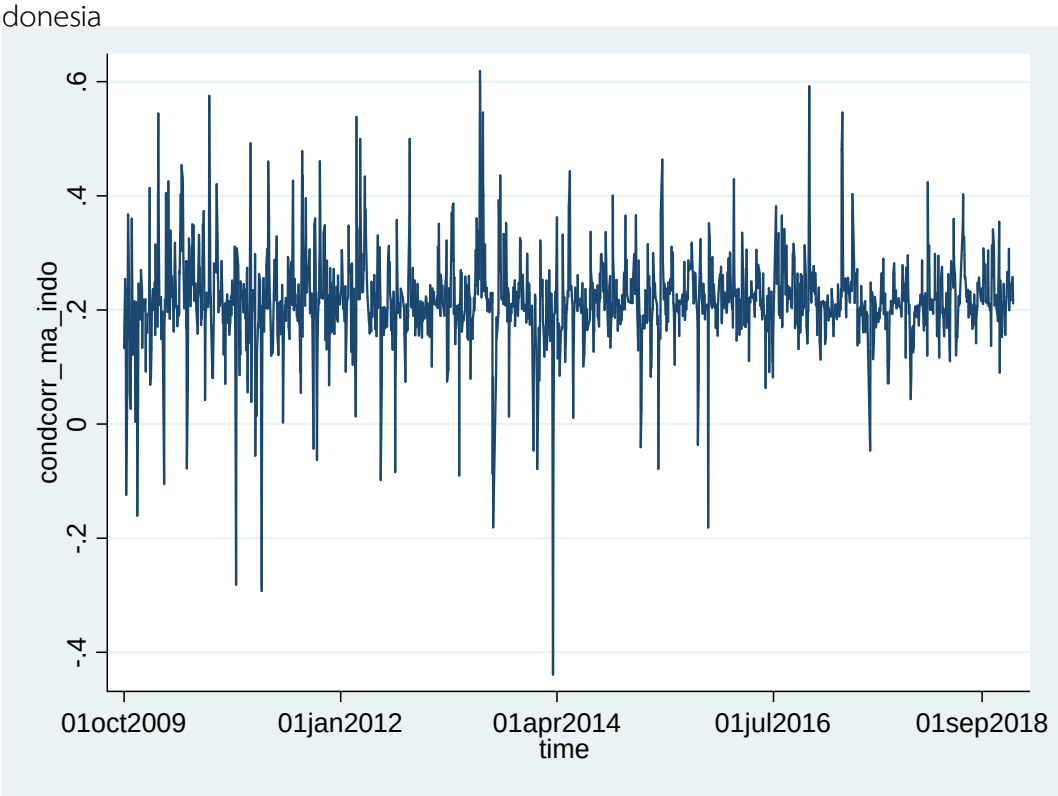


Figure 7: Correlations of daily net foreign equity flows between Thailand and Indonesia

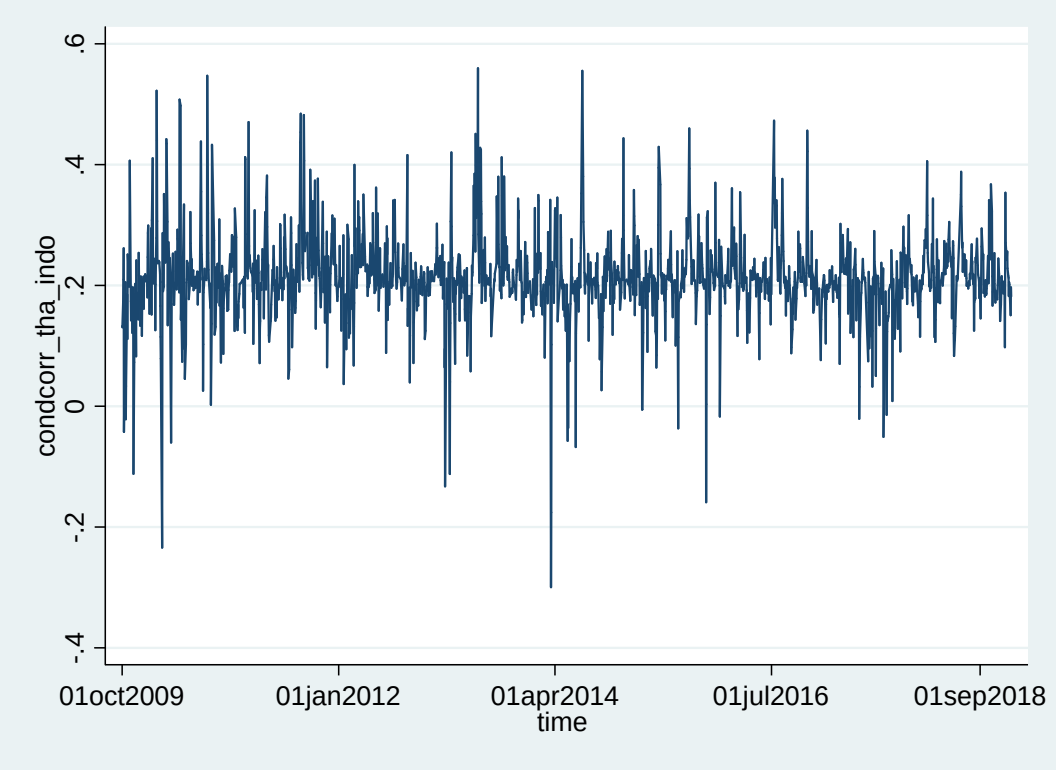


Figure 8: Correlations of daily net foreign equity flows between the Philippines and Indonesia

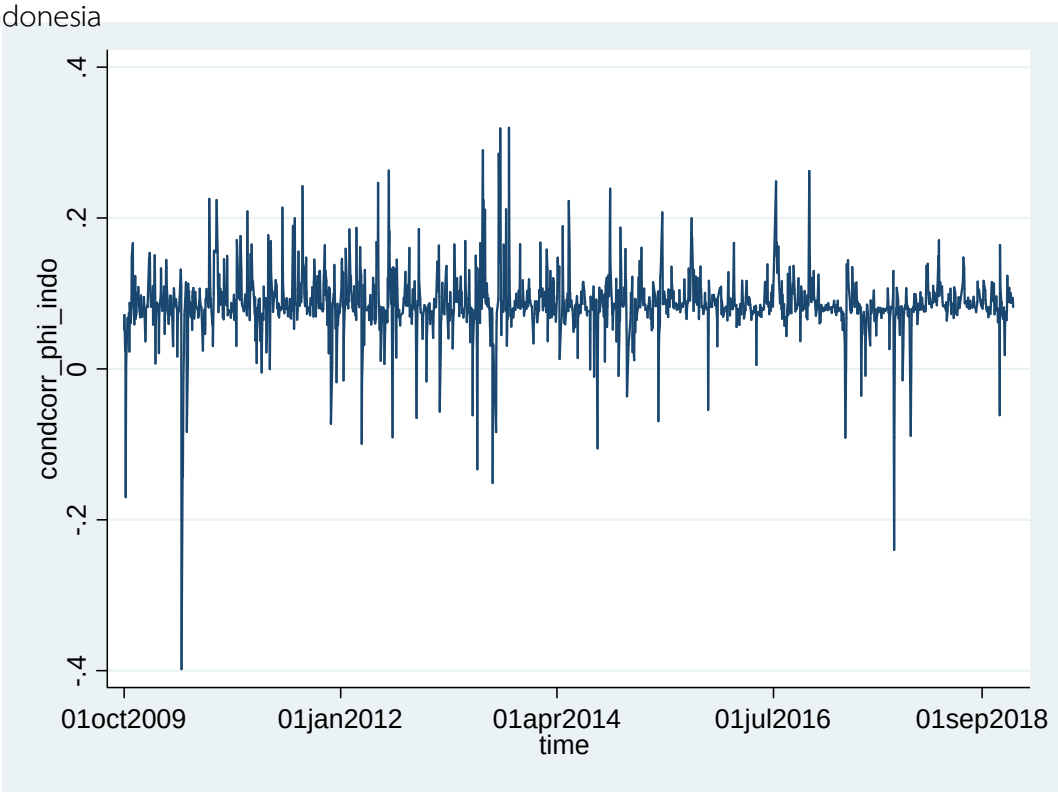


Figure 9: Correlations of daily net foreign equity flows between Malaysia and Thailand

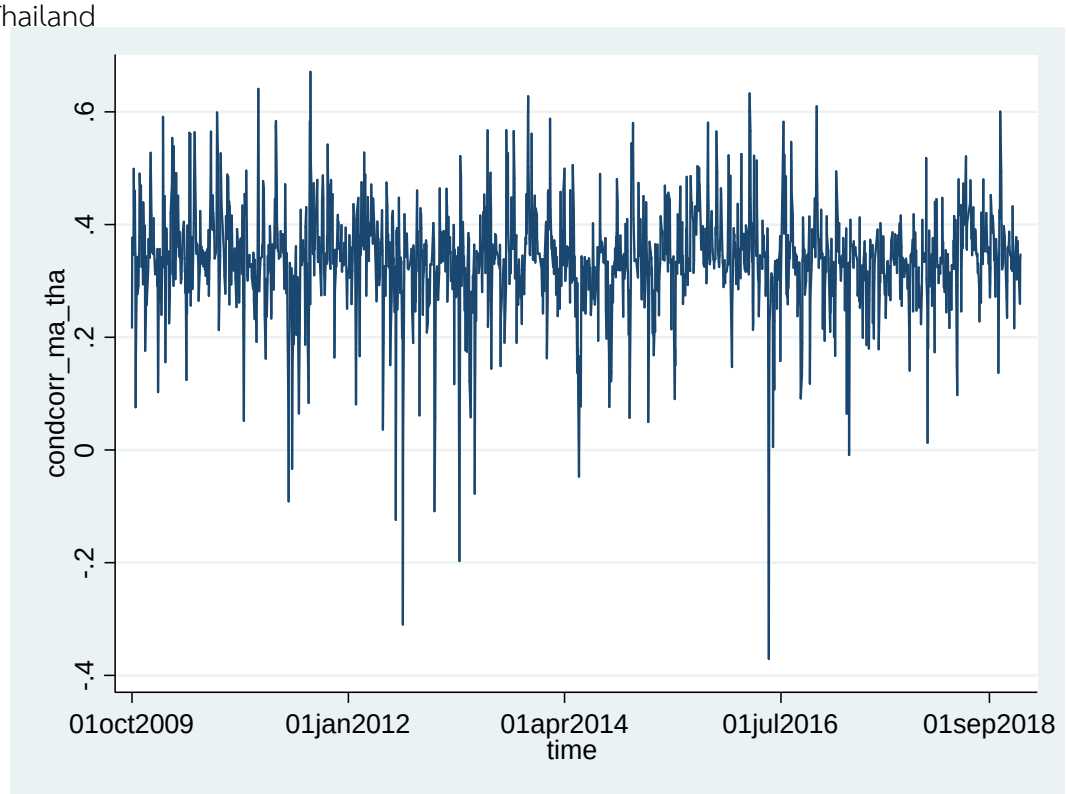


Figure 10: Correlations of daily net foreign equity flows between the Philippines and Thailand

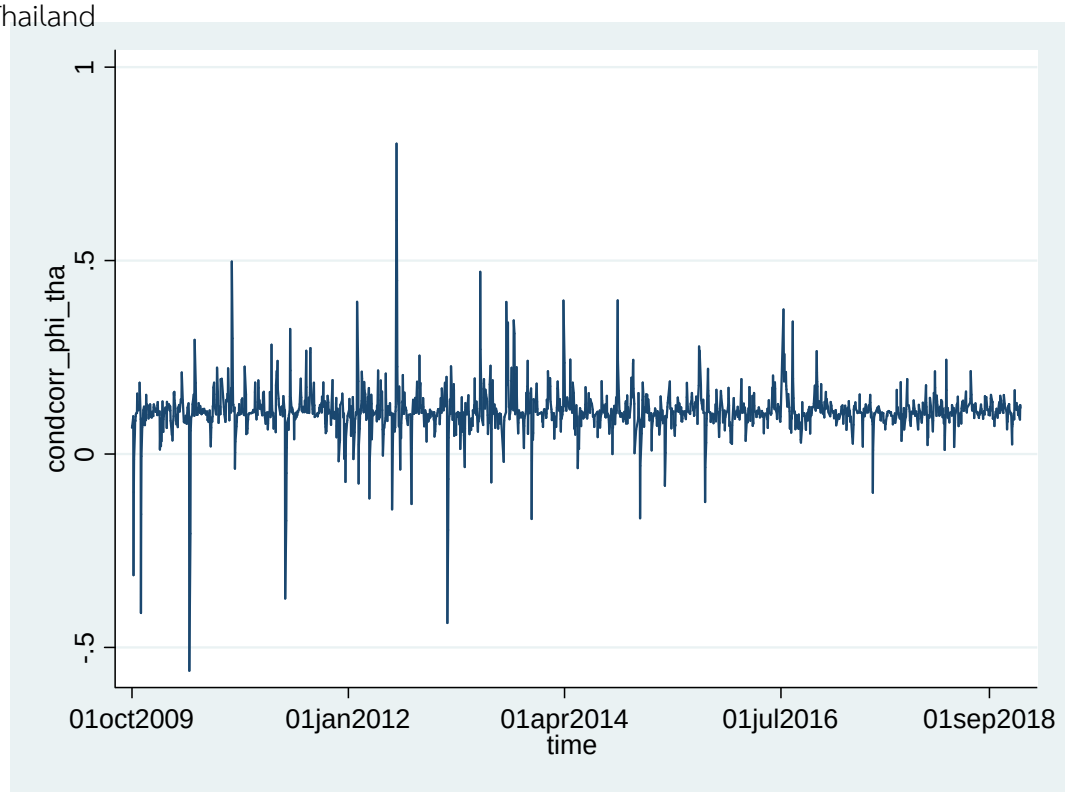


Figure 11: Correlations of daily net foreign equity flows between the Philippines and Malaysia

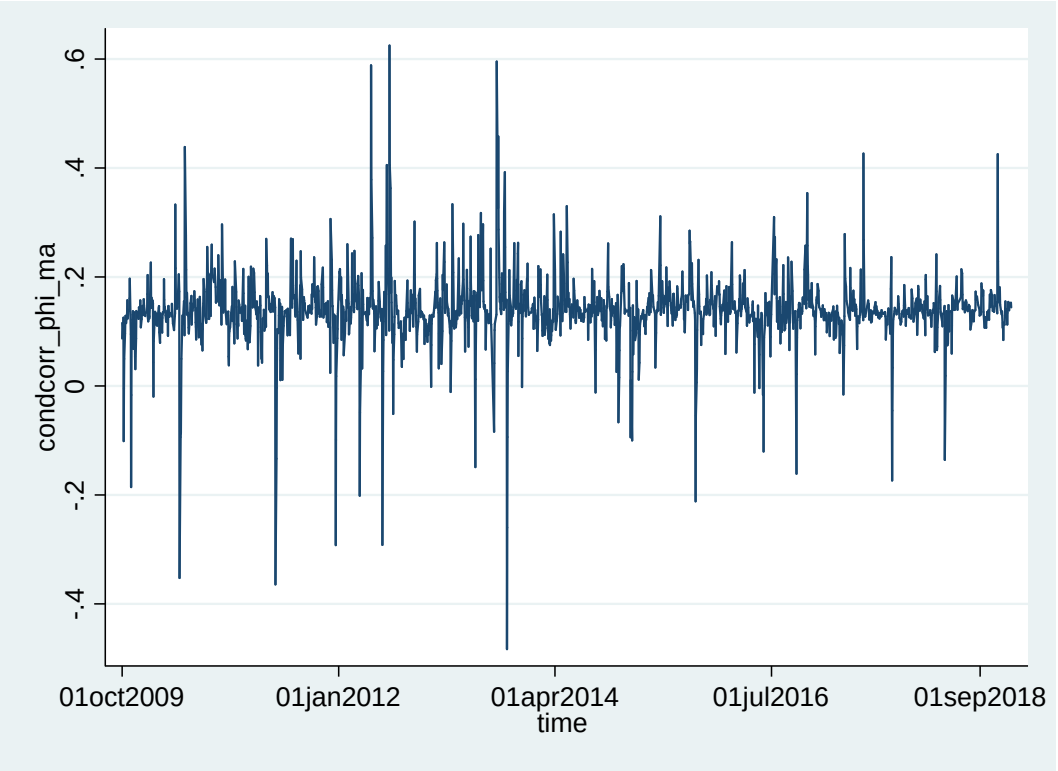


Table 5: Conditional covariance of the Philippines and Malaysia change over time (Volatility co-movement)

condvar_phi_ma	Coef.	Std. Err.	t-Statistic	Prob.
time	-1.66e-07	1.62e-08	-10.26	0.000
_cons	.0006957	.0000183	37.93	0.000
R-squared	0.0509			
Adjusted R-squared	0.0504			
Root MSE	.00041			

Table 6: Conditional covariance of the Philippines and Thailand change over time (Volatility co-movement)

condvar_phi_tha	Coef.	Std. Err.	t-Statistic	Prob.
time	-2.13e-06	9.28e-08	-22.96	0.000
_cons	.0061052	.0001052	58.01	0.000
R-squared	0.2117			
Adjusted R-squared	0.2113			
Root MSE	.00233			

Table 7: Conditional covariance of the Philippines and Indonesia change over time (Volatility co-movement)

condvar_phi_indo	Coef.	Std. Err.	t-Statistic	Prob.
time	-4.38e-07	4.56e-08	-9.59	0.000
_cons	.0032615	.0000518	63.00	0.000
R-squared	0.0448			
Adjusted R-squared	0.0443			
Root MSE	.00115			

Table 8: Conditional covariance of between Malaysia and Thailand change over time (Volatility co-movement)

condvar_ma_tha	Coef.	Std. Err.	t-Statistic	Prob.
time	-1.29e-06	4.43e-08	-29.04	0.000
_cons	.0027688	.0000502	55.13	0.000
R-squared	0.3006			
Adjusted R-squared	0.3003			
Root MSE	.00111			

Table 9: Conditional covariance of Malaysia and Indonesia change over time (Volatility co-movement)

condvar_ma_indo	Coef.	Std. Err.	t-Statistic	Prob.
time	-3.71e-07	2.28e-08	-16.27	0.000
_cons	.0011886	.0000259	45.98	0.000
R-squared	0.1189			
Adjusted R-squared	0.1184			
Root MSE	.00057			

Table 10: Conditional covariance of Thailand and Indonesia change over time (Volatility co-movement)

condvar_tha_indo	Coef.	Std. Err.	t-Statistic	Prob.
time	-5.42e-06	1.40e-07	-38.78	0.000
_cons	.0130866	.0001586	82.54	0.000
R-squared	0.4339			
Adjusted R-squared	0.4336			
Root MSE	.00351			

Figure 12: Volatility co-movement between the Philippines and Malaysia

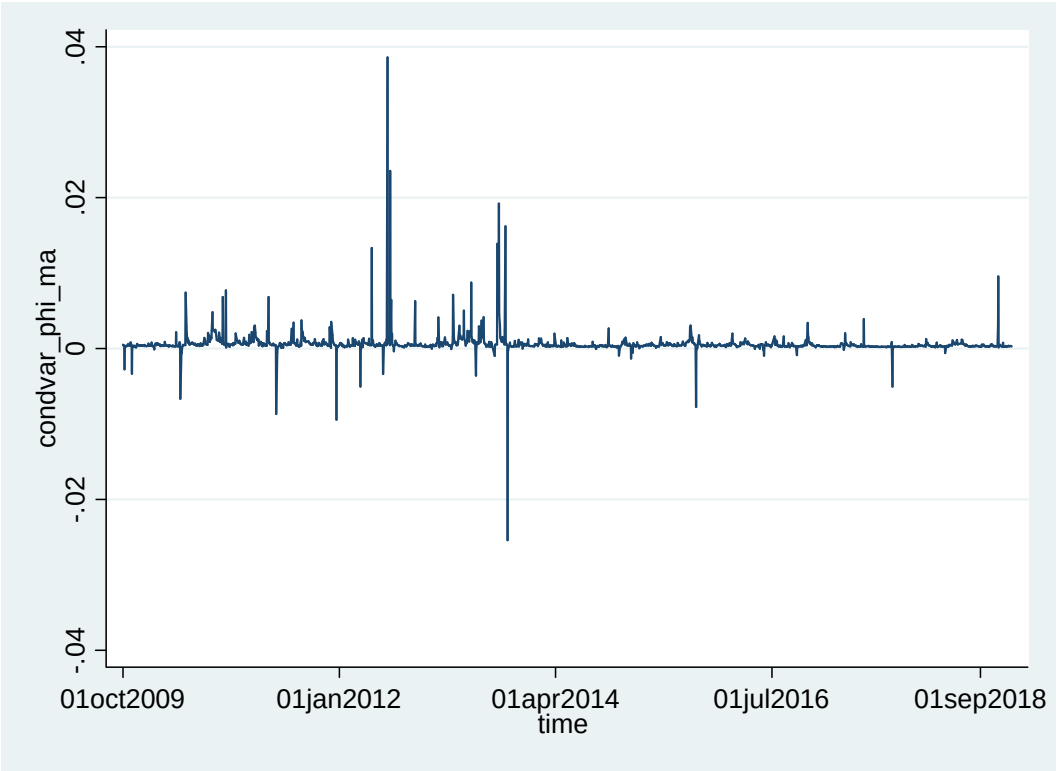


Figure 13: Volatility co-movement between the Philippines and Thailand

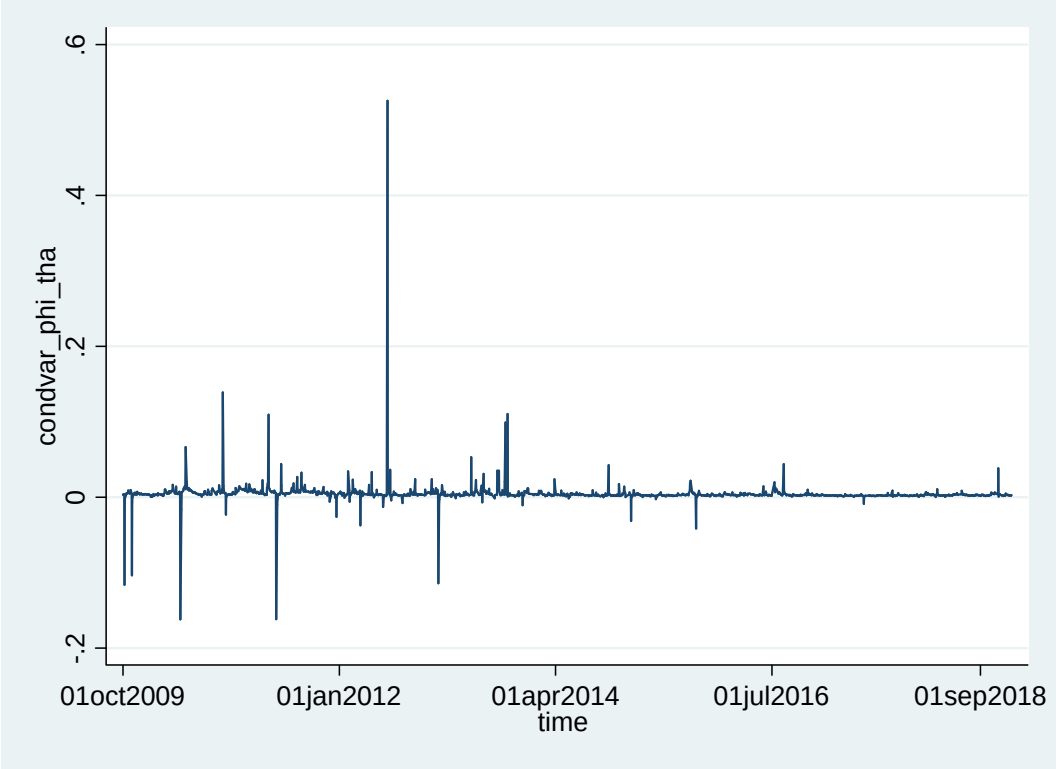


Figure 14: Volatility co-movement between the Philippines and Indonesia

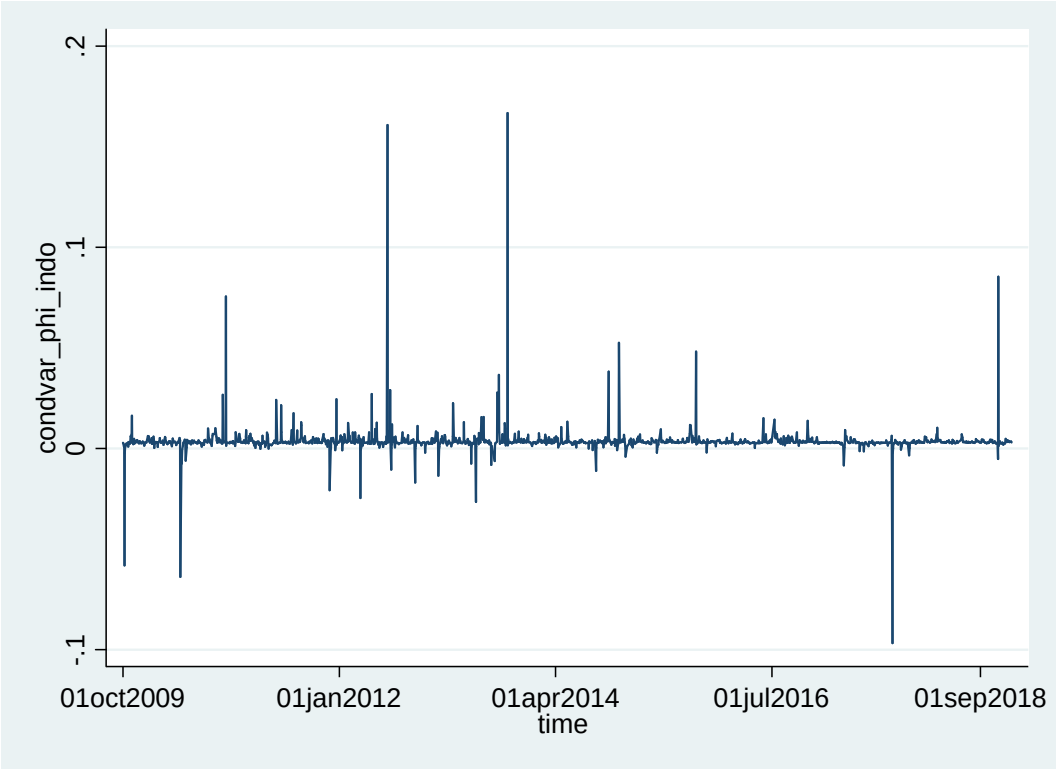


Figure 15: Volatility co-movement between Malaysia and Thailand

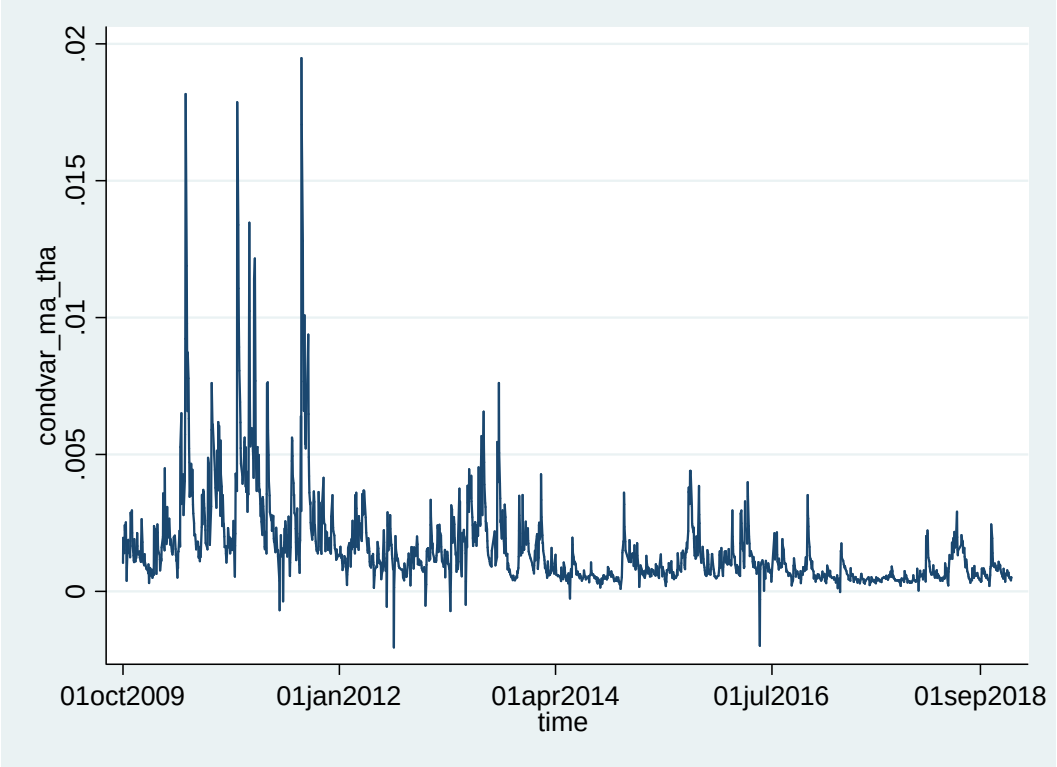


Figure 16: Volatility co-movement between Malaysia and Indonesia

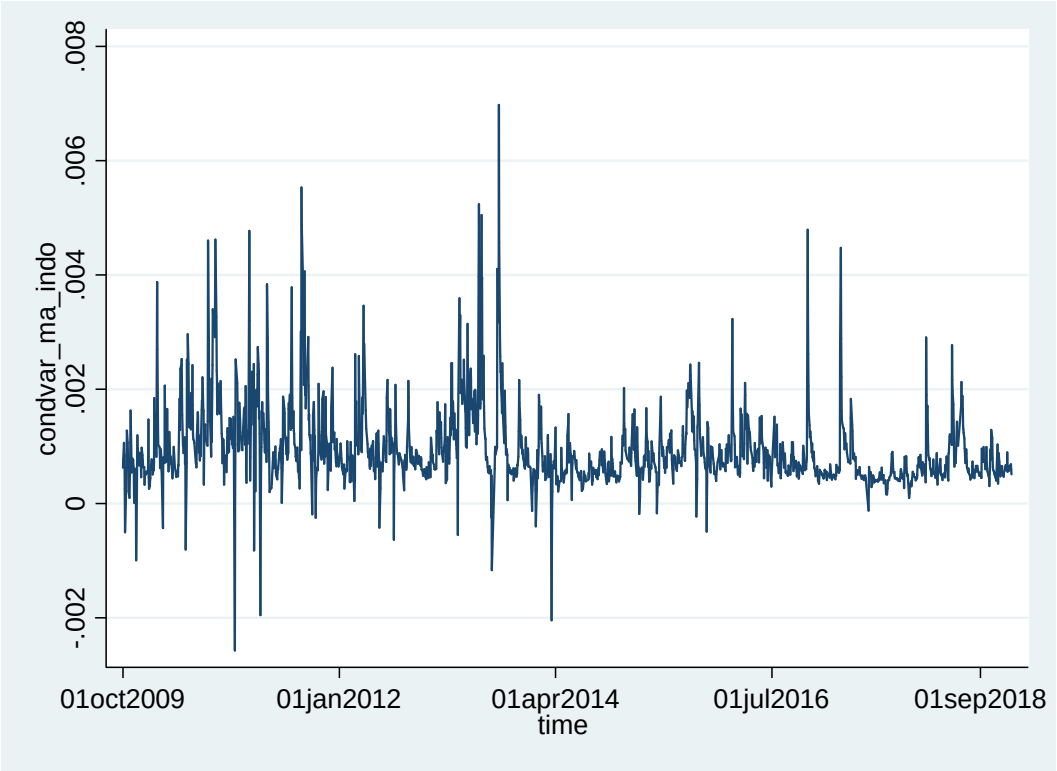


Figure 17: Volatility co-movement between Thailand and Indonesia

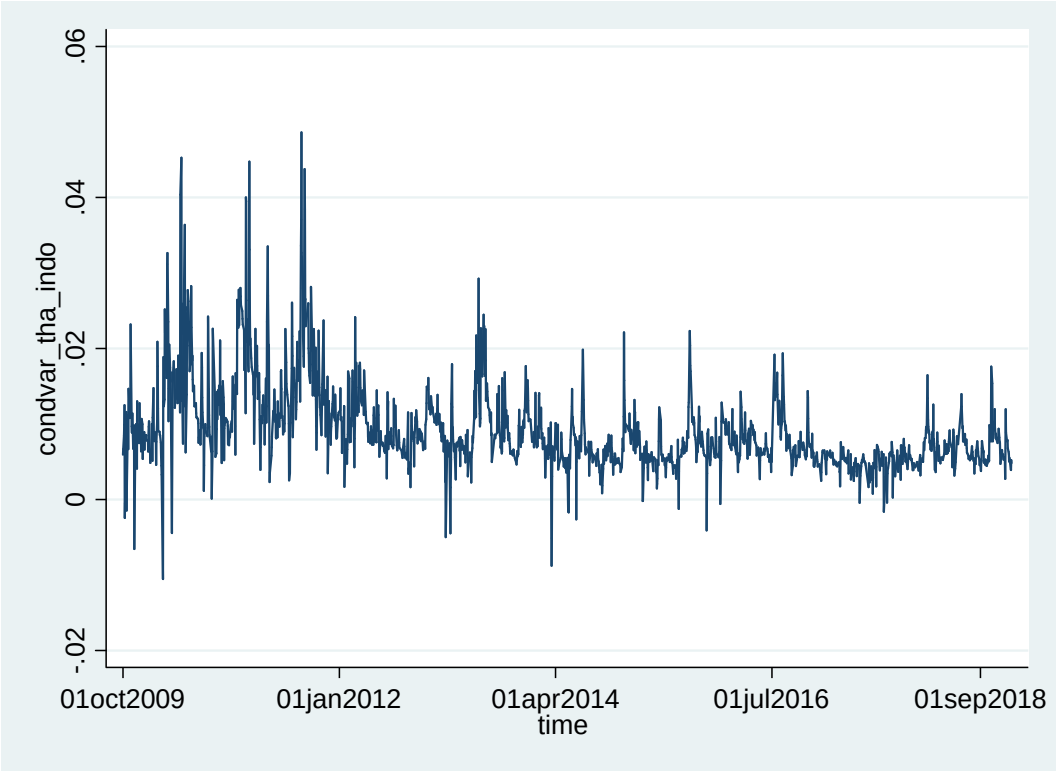


Figure 18: Correlation of net equity flows between countries from 2010 to 2018

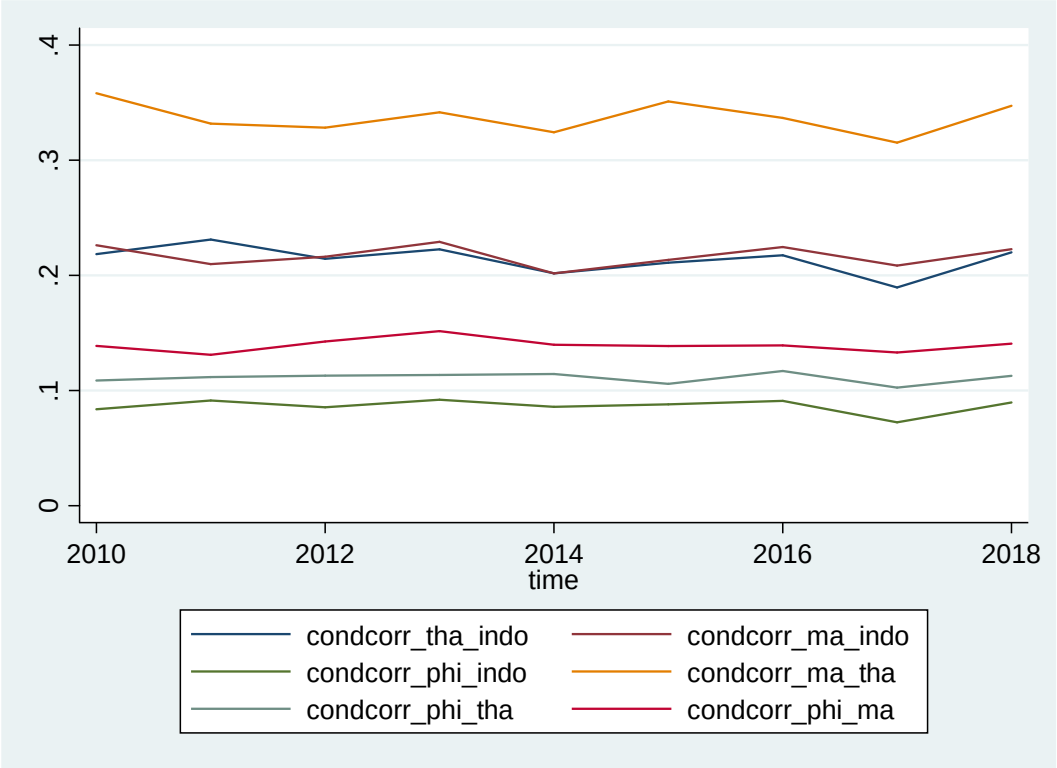
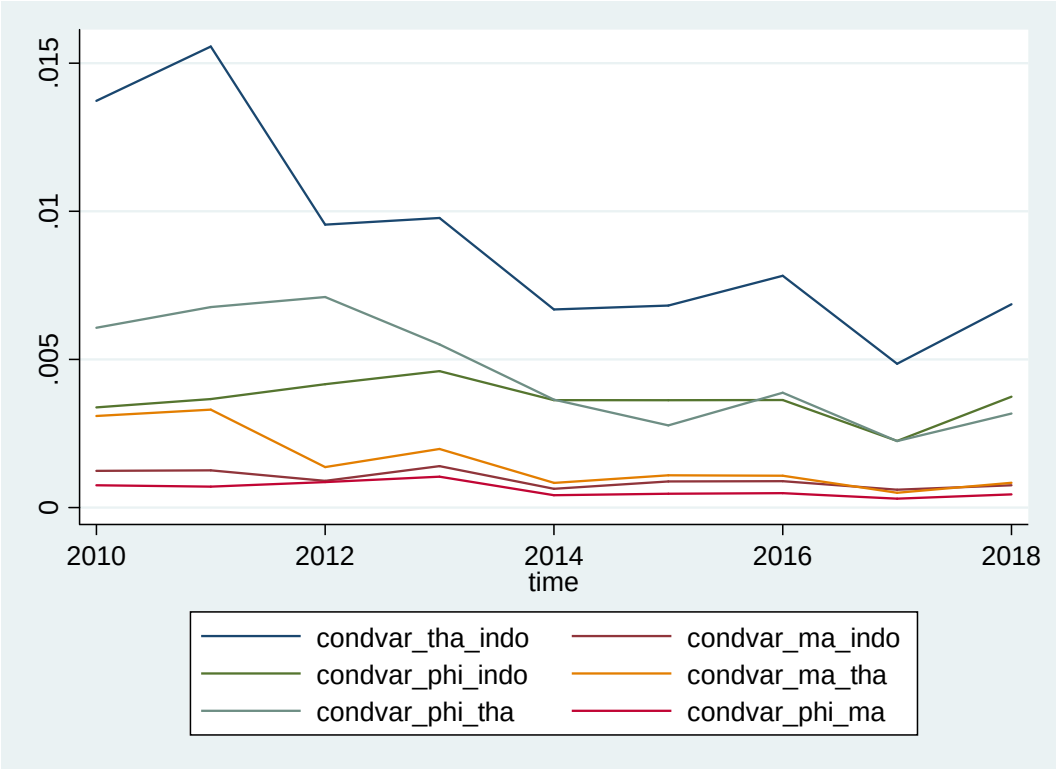


Figure 19: Volatility co-movement between countries from 2010 to 2018



The volatility co-movement tends to be lower in Indonesia, Malaysia, Thailand, and the Philippines. This study finds a statistically significant of time on a pair of covariance with a negative coefficient measured as the volatility co-movement cross-market will decrease over time.

This is consistent with Jiang, Nie et al. (2017) explain that the co-movement is particularly significant during the period of the global financial crisis recovery and the interdependent of short-term in ASEAN stock markets was temporary and diminishing to the previous volatility level after 1–2 years. Also consistent with Boonbandanrit (2015) explain that completely integration has not occurred in ASEAN regional cooperation. The ASEAN trading link does not have more power to increase our interdependence dramatically.

Second, this study converts variance to monthly and using the seemingly unrelated regressions to analyze the effect of global uncertainty factors, domestic macroeconomic factors and domestic structural factors to the volatility of net equity flows in four emerging markets.

Table 11: Definition of variables

Variables	Definition
condvar_indo	Conditional variance of net foreign equity flows to Indonesia
condvar_tha	Conditional variance of net foreign equity flows to Thailand
condvar_ma	Conditional variance of net foreign equity flows to Malaysia
condvar_phi	Conditional variance of net foreign equity flows to Philippines
dus_bond	The first difference of 10-year US Treasury bond yield
us_inf	The US inflation
dus_ipi	The first difference of US industrial production index
vix	The Volatility index
doil	The first difference of oil price
dindo_inf	The first difference of Indonesia inflation
indo_re	Indonesia international reserve
dindo_ex	The first difference of Indonesia exchange rate (indirect quote)

Variables	Definition
dindo_ipi	The first difference of Indonesia industrial production index
dratedif_indo	The first difference of policy rate differential between US and Indonesia
dtha_inf	The first difference of Thailand inflation
dtha_re	The first difference of Thailand international reserve
dtha_ex	The first difference of Thailand exchange rate (indirect quote)
tha_ipi	Thailand industrial production index
dratedif_tha	The first difference of policy rate differential between US and Thailand
ma_inf	Malaysia inflation
dma_re	The first difference of Malaysia international reserve
dma_ex	The first difference of Malaysia exchange rate (indirect quote)
dma_ipi	The first difference of Malaysia industrial production index
dratedif_ma	The first difference of policy rate differential between US and Malaysia
dphi_inf	The first difference of the Philippines inflation
phi_re	The Philippines international reserve
dphi_ex	The first difference of the Philippines exchange rate (indirect quote)
dphi_ipi	The first difference of the Philippines industrial production index
dratedif_phi	The first difference of policy rate differential between US and the Philippines

Table 12: Results of the SUR model

Equation	Obs	Parms	RMSE	"R-sq"	chi2	P
condvar_indo	110	10	.00177	0.0852	10.41	0.4054
condvar_tha	110	10	.0460472	0.2679	36.64	0.0001
condvar_ma	110	10	.0004987	0.0510	6.37	0.7829
condvar_phi	110	10	.0710655	0.1510	19.49	0.0344

	Coef.	Std. Err.	z	P>| z |	[95% Conf.	Interval]
condvar_indo						
dus_bond	.0004495	.0008433	0.53	0.594	-.0012033	.0021024
us_inf	-.0004043	.0002178	-1.86	0.063	-.0008313	.0000226
dus_ipi	.0005899	.0003874	1.52	0.128	-.0001695	.0013492
vix	.000016	.0000207	0.77	0.439	-.0000245	.0000565
doil	-.0000378	.0000331	-1.14	0.254	-.0001027	.0000271
dindo_inf	.0001766	.0002895	0.61	0.542	-.0003909	.0007441
indo_re	5.10e-09	1.37e-08	0.37	0.710	-2.18e-08	3.20e-08
dindo_ex	1.03e-06	8.74e-07	1.18	0.240	-6.86e-07	2.74e-06
dindo_ipi	.0000194	.0000391	0.50	0.620	-.0000572	.0000959
dratedif_indo	-.00013	.0007223	-0.18	0.857	-.0015456	.0012857
_cons	.043549	.0016416	26.53	0.000	.0403314	.0467665
condvar_tha						
dus_bond	-.0071105	.0227792	-0.31	0.755	-.051757	.0375359
us_inf	.0062603	.0055207	1.13	0.257	-.0045601	.0170807
dus_ipi	.008998	.0102133	0.88	0.378	-.0110198	.0290158
vix	.001339	.0005251	2.55	0.011	.0003097	.0023682
doil	.0013361	.0009175	1.46	0.145	-.0004622	.0031345
dtha_inf	-.0013921	.0113767	-0.12	0.903	-.0236899	.0209058
dtha_re	8.36e-07	3.62e-06	0.23	0.817	-6.25e-06	7.93e-06
dtha_ex	.0186789	.0130414	1.43	0.152	-.0068817	.0442396
tha_ipi	.0003236	.000214	1.51	0.131	-.0000959	.0007431
dratedif_tha	.1386289	.0349375	3.97	0.000	.0701527	.2071052
_cons	-.0229955	.0261471	-0.88	0.379	-.0742429	.0282519
condvar_ma						
dus_bond	-.0001011	.0002402	-0.42	0.674	-.0005718	.0003697
us_inf	-.0000354	.000061	-0.58	0.561	-.0001549	.0000841
dus_ipi	.0000333	.0001091	0.31	0.760	-.0001805	.0002472

vix	-4.05e-06	5.33e-06	-0.76	0.448	-.0000145	6.40e-06
doil	6.94e-06	1.00e-05	0.69	0.487	-.0000127	.0000265
ma_inf	-.0000141	.0000447	-0.32	0.752	-.0001017	.0000735
dma_re	3.33e-08	1.99e-08	1.67	0.094	-5.70e-09	7.22e-08
dma_ex	.0008866	.0007462	1.19	0.235	-.0005758	.0023491
dma_ipi	-5.69e-06	8.39e-06	-0.68	0.498	-.0000221	.0000108
dratedif_ma	.0005342	.0004556	1.17	0.241	-.0003587	.0014271
_cons	.0007016	.000196	3.58	0.000	.0003175	.0010857
condvar_phi						
dus_bond	-.0363973	.0353247	-1.03	0.303	-.1056324	.0328378
us_inf	-.006047	.008511	-0.71	0.477	-.0227282	.0106342
dus_ipi	.0144003	.0155028	0.93	0.353	-.0159846	.0447852
vix	-.0018373	.0009013	-2.04	0.041	-.0036037	-.0000708
doil	-.0008836	.0013828	-0.64	0.523	-.0035938	.0018266
dphi_inf	-.0136413	.0187434	-0.73	0.467	-.0503778	.0230951
phi_re	-4.06e-07	8.03e-07	-0.51	0.613	-1.98e-06	1.17e-06
dphi_ex	-.0379347	.0141738	-2.68	0.007	-.0657148	-.0101546
dphi_ipi	.000956	.0007852	1.22	0.223	-.000583	.0024949
dratedif_phi	.018615	.0438013	0.42	0.671	-.067234	.1044639
_cons	.1443199	.0773046	1.87	0.062	-.0071944	.2958342

Regarding global factors, this study finds a statistically significant correlation between change in policy rate differential and the volatility of net foreign equity flows in Thailand with a positive sign of the coefficient could reflect the increase of change in the gap between US policy rate and Thailand rate will increase the net foreign equity flows volatile. Also uncertainty risk has a statistically significant impact on net foreign equity flows volatility with positive sign meaning that higher risk aversion will increase the volatility of net foreign equity flows is according to Ahmed and Zlate (2014) explain that the different policy rate between advanced economies and emerging market also the global risk aversion are significant driver of flows to the emerging markets. And

consistent with Broto, Díaz-Cassou et al. (2011) find that global factors as captured by S&P stock index and US interest rate are the important factor of flow volatility.

The domestic variable has a significant relation with the net foreign equity flows volatility. This study finds a statistically significant relationship of change in exchange with the volatility of net foreign equity flows in the Philippines with a negative correlation could reflect the increasing of change in exchange rate will decrease the volatility of equity flows in the Philippines its mean appreciation of home currency against the US dollar will reduce the net foreign equity flows volatility. When the US federal reserve has raised interest rate will make the net foreign equity flows volatile and US dollar appreciation against home currency consistent with Ahmed and Zlate (2014) that exchange rate takes the role of a shock absorber. And consistent with Hwa, Raghavan et al. (2017) that higher flows reach to exchange rate appreciation immediately and the effect of flows decreased most suddenly by the exchange rate.

CHAPTER 6: CONCLUSION

In recent years, net foreign equity flows have been volatile in ASEAN stock markets. This study shows evidence of factors affecting the volatility of net foreign equity flows. From a technical point of view, this study extends in two steps. First, using daily data of net foreign equity flows divided by each stock market capitalization and the Dynamic Conditional Correlation Multivariate GARCH model for predicting a variance of each country to represent the volatility of equity flows and covariance to represent volatility co-movement cross-country also identify the correlation between each country. Second, this study converts variance to monthly and using the seemingly unrelated regressions to analyze the effect of global uncertainty factors, domestic macroeconomic factors, and domestic structural factors to the volatility of net equity flows in four emerging markets.

This analysis shows that net foreign equity flows to four emerging markets have volatile for each country and their cross-market correlation appears. However, volatility co-movement cross-markets seem to decrease over time. This suggests that the ASEAN emerging markets is a good region for portfolio diversification as reducing risk due to the volatility co-movement will decrease over time. The policymakers use as the information to support the timing for implementing intervention through monetary policies and individual investors for constructing a diversified portfolio.

The analysis also presents the volatility of net foreign equity flows in each market affected by different factors. This study finds a statistically significant of the change in different policy rate between The US and Thailand and risk aversion increase the net equity flows volatility in Thailand. Also, find a statistically significant negative relationship with the change in the exchange rate in the Philippines. This suggests that exchange rate operations by the central bank are conducted to reduce exchange rates volatility and net foreign equity flows volatility.

Finally, this study does not find a statistically significant impact of global factors on the net equity flows volatility in Indonesia, Malaysia, and the Philippines and does

not find a statistically significant relationship between domestic factors and the net equity flows volatility in Indonesia, Malaysia, and Thailand.

All in all, the global factors affect the increase of net equity flows volatility and the domestic policy can help reducing their volatility in particular solid macroeconomic fundamentals such as exchange rate and domestic policy rate may significantly reduce the volatility of net equity flows.

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APPENDIX

Table A-1: Results of augmented dickey-fuller unit root test

Variable	ADF statistic	5% critical value	10% critical value	P-value	Conclusion
Daily net foreign equity flows					
Indonesia	-36.912	-2.860	-2.579	0.0000	Stationary
Malaysia	-22.754	-2.860	-2.579	0.0000	Stationary
Thailand	-27.558	-2.860	-2.579	0.0000	Stationary
The Philippines	-42.006	-2.860	-2.579	0.0000	Stationary
Conditional variance of net foreign equity flows					
Indonesia	-7.257	-2.889	-2.579	0.0000	Stationary
Malaysia	-5.570	-2.889	-2.579	0.0000	Stationary
Thailand	-5.293	-2.889	-2.579	0.0000	Stationary
The Philippines	-10.509	-2.889	-2.579	0.0000	Stationary
10-years US Treasury bond yield					
Level	-2.333	-2.889	-2.579	0.1617	Non-stationary
First difference	-9.685	-2.889	-2.579	0.0000	Stationary
The US industrial production index					
Level	-1.961	-2.889	-2.579	0.3040	Non-stationary
First difference	-9.971	-2.889	-2.579	0.0000	Stationary

Variable	ADF statistic	5% critical value	10% critical value	P-value	Conclusion
The US inflation					
Level	-2.720	-2.889	-2.579	0.0707	Stationary
VIX					
Level	-2.658	-2.889	-2.579	0.0817	Stationary
Oil price					
Level	-0.920	-2.889	-2.579	0.7813	Non-stationary
First difference	-7.591	-2.889	-2.579	0.0000	Stationary
Indonesia Inflation					
Level	-2.058	-2.889	-2.579	0.2619	Non-stationary
First difference	-7.762	-2.889	-2.579	0.0000	Stationary
International reserve					
Level	-2.913	-2.889	-2.579	0.0439	Stationary
Exchange rate					
Level	0.063	-2.889	-2.579	0.9635	Non-stationary
First difference	-8.251	-2.889	-2.579	0.0000	Stationary
Industrial production index					
Level	-1.402	-2.889	-2.579	0.5813	Non-stationary
First difference	-15.114	-2.889	-2.579	0.0000	Stationary
Policy rate differential					
Level	-0.388	-2.889	-2.579	0.9121	Non-stationary
First difference	-8.901	-2.889	-2.579	0.0000	Stationary

Variable	ADF statistic	5% critical value	10% critical value	P-value	Conclusion
Thailand					
Inflation					
Level	-1.363	-2.889	-2.579	0.6001	Non-stationary
First difference	-8.011	-2.889	-2.579	0.0000	Stationary
International reserve					
Level	-1.223	-2.889	-2.579	0.6636	Non-stationary
First difference	-8.337	-2.889	-2.579	0.0000	Stationary
Exchange rate					
Level	-1.239	-2.889	-2.579	0.6565	Non-stationary
First difference	-6.713	-2.889	-2.579	0.0000	Stationary
Industrial production index					
Level	-5.243	-2.889	-2.579	0.0000	Stationary
Policy rate differential					
Level	-0.404	-2.889	-2.579	0.9095	Non-stationary
First difference	-8.459	-2.889	-2.579	0.0000	Stationary
Malaysia					
Inflation					
Level	-3.359	-2.889	-2.579	0.0124	Stationary
International reserve					
Level	-0.973	-2.889	-2.579	0.7632	Non-stationary
First difference	-7.667	-2.889	-2.579	0.0000	Stationary
Exchange rate					
Level	-0.286	-2.889	-2.579	0.9275	Non-stationary

Variable	ADF statistic	5% critical value	10% critical value	P-value	Conclusion
First difference	-7.090	-2.889	-2.579	0.0000	Stationary
Industrial production index					
Level	-1.786	-2.889	-2.579	0.3873	Non-stationary
First difference	-20.670	-2.889	-2.579	0.0000	Stationary
Policy rate differential					
Level	-1.221	-2.889	-2.579	0.9961	Non-stationary
First difference	-11.382	-2.889	-2.579	0.0000	Stationary
The Philippines Inflation					
Level	-1.059	-2.889	-2.579	0.7313	Non-stationary
First difference	-7.128	-2.889	-2.579	0.0000	Stationary
International reserve					
Level	-4.195	-2.889	-2.579	0.0007	Stationary
Exchange rate					
Level	0.442	-2.889	-2.579	0.9830	Non-stationary
First difference	-8.267	-2.889	-2.579	0.0000	Stationary
Industrial production index					
Level	-2.081	-2.889	-2.579	0.2520	Non-stationary
First difference	-12.048	-2.889	-2.579	0.0000	Stationary
Policy rate differential					
Level	-1.423	-2.889	-2.579	0.5712	Non-stationary

Variable	ADF statistic	5% critical value	10% critical value	P-value	Conclusion
First difference	-9.774	-2.889	-2.579	0.0000	Stationary

Table A-2: Correlation between Indonesia domestic factors and global factors

	dus_bond	us_inf	dus_ipi	vix	doil	dindo_inf	indo_re	dindo_ex	dindo_ipi	dratedif_indo
dus_bond	1.0000									
us_inf	-0.0732	1.0000								
dus_ipi	-0.0858	0.3713	1.0000							
vix	-0.1072	0.0487	0.1581	1.0000						
doil	0.3188	0.1355	-0.0680	0.0567	1.0000					
dindo_inf	0.0160	0.0113	0.1076	0.0694	-0.0618	1.0000				
indo_re	-0.0179	0.2093	-0.0767	-0.3803	-0.0561	-0.2014	1.0000			
dindo_ex	0.1003	-0.0647	-0.0170	-0.2411	-0.0477	0.0917	0.0471	1.0000		
dindo_ipi	0.0401	0.0139	-0.0189	-0.0187	-0.0024	0.0661	0.0248	0.1203	1.0000	
dratedif_indo	-0.0349	0.0726	0.0654	-0.1122	-0.0128	0.0763	-0.1426	0.1630	-0.0578	1.0000

Table A-3: Correlation between Thailand domestic factors and global factors

	dus_bond	us_inf	dus_ipi	vix	doil	dtha_inf	dtha_re	dtha_ex	tha_ipi	dratedif_tha
dus_bond	1.0000									
us_inf	-0.0732	1.0000								
dus_ipi	-0.0858	0.3713	1.0000							
vix	-0.1072	0.0487	0.1581	1.0000						
doil	0.3188	0.1355	-0.0680	0.0567	1.0000					
dtha_inf	0.1687	0.1553	0.0380	0.2352	0.2739	1.0000				
dtha_re	-0.1412	-0.0804	-0.1950	0.3467	0.2594	0.1425	1.0000			
dtha_ex	0.0780	-0.0617	0.0149	-0.1821	-0.1978	-0.0056	-0.5856	1.0000		
tha_ipi	0.0829	-0.0089	0.0046	-0.0961	-0.0736	-0.0530	0.1103	-0.1500	1.0000	
dratedif_tha	-0.0648	0.1761	0.0433	0.00546	0.0986	0.1237	0.1232	-0.0505	-0.1701	1.0000

Table A-4: Correlation between Malaysia domestic factors and global factors

	dus_bond	us_inf	dus_ipi	vix	doil	ma_inf	dma_re	dma_ex	dma_ipi	dratedif_ma
dus_bond	1.0000									
us_inf	-0.0732	1.0000								
dus_ipi	-0.0858	0.3713	1.0000							
vix	-0.1072	0.0487	0.1581	1.0000						
doil	0.3188	0.1355	-0.0680	0.0567	1.0000					
ma_inf	-0.1309	0.1494	-0.0164	-0.1290	-0.0095	1.0000				
dma_re	0.0265	0.2791	-0.0425	0.1148	0.3612	0.0998	1.0000			
dma_ex	0.0147	-0.1616	-0.0207	-0.1990	-0.3221	-0.1276	-0.4119	1.0000		
dma_ipi	0.0666	0.0197	0.0569	-0.0126	-0.0598	0.0039	-0.0334	0.0733	1.0000	
dratedif_ma	0.0613	0.0072	-0.0485	0.0143	-0.0501	0.0684	-0.0058	0.0040	0.0160	1.0000

Table A-5: Correlation between the Philippines domestic factors and global factors

	dus_bond	us_inf	dus_ipi	vix	doil	dphi_inf	phi_re	dphi_ex	dphi_ipi	dratedif_phi
dus_bond	1.0000									
us_inf	-0.0732	1.0000								
dus_ipi	-0.0858	0.3713	1.0000							
vix	-0.1072	0.0487	0.1581	1.0000						
doil	0.3188	0.1355	-0.0680	0.0567	1.0000					
dphi_inf	0.2185	0.1321	-0.0052	0.1068	0.2563	1.0000				
phi_re	0.0811	-0.1951	-0.2188	-0.5784	-0.1010	-0.0583	1.0000			
dphi_ex	0.1473	-0.0671	-0.0242	-0.0884	-0.1440	0.1649	0.2186	1.0000		
dphi_ipi	0.2033	-0.0414	0.0114	0.0059	0.0886	-0.0419	0.0124	-0.0121	1.0000	
dratedif_phi	0.0040	0.0928	0.0971	-0.0049	-0.0965	0.1025	-0.0347	0.1425	-0.0642	1.0000

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