

Title: **Measuring Regional Economic Integration: The Case of ASEAN Economies**

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## **Measuring Regional Economic Integration: The Case of ASEAN Economies**

### **Abstract**

The ASEAN, the regional organization comprising 10 countries, is committed to strengthen regional cooperation and integration via the formation of ASEAN Economic Community (AEC) by end-2015. Although ASEAN has come long way toward realizing its AEC goal, but is ASEAN likely to achieve the goal of regional economic integration? This study aims to examine the progress of economic integration in the region for the period January 2000 – June 2015 by focusing on goods and services markets as well as on financial markets. Utilizing the methodology based on international parity conditions: purchasing power parity and uncovered interest parity, the study finds that while the economic integration amongst ASEAN economies is relatively advanced with respect to goods and services, the financial market integration remains incomplete. The conclusion is that although the region is already relatively integrated in goods and services, financial integration is weak. The policy implications are: (i) impact of future liberalization is likely to be substantial on financial markets; (ii) the pace of financial sector liberalization should be stepped up; and (iii) capital mobility amongst ASEAN economies should be promoted by dismantling the existing barriers.

*Keywords: Economic integration, purchasing power parity, uncovered interest parity,*

## **Introduction**

Successful efforts culminating in the introduction of a single currency in Europe, and other similar efforts in terms of monetary union in developing countries in other regions, encouraged policy-makers in ASEAN region to promote regional economic integration. In October 2003, ASEAN Leaders decided to deepen and broaden economic integration beyond AFTA when they declared the formation of the ASEAN Economic Community (AEC). AEC, planned to come into effect by December 31<sup>st</sup>, 2015, aims to establish ASEAN as a single market and production base making that comprises of 5 core elements: (i) free flow of goods; (ii) free flow of services; (iii) free flow of investment; (iv) free flow of capital; and (v) free flow of skilled labour.

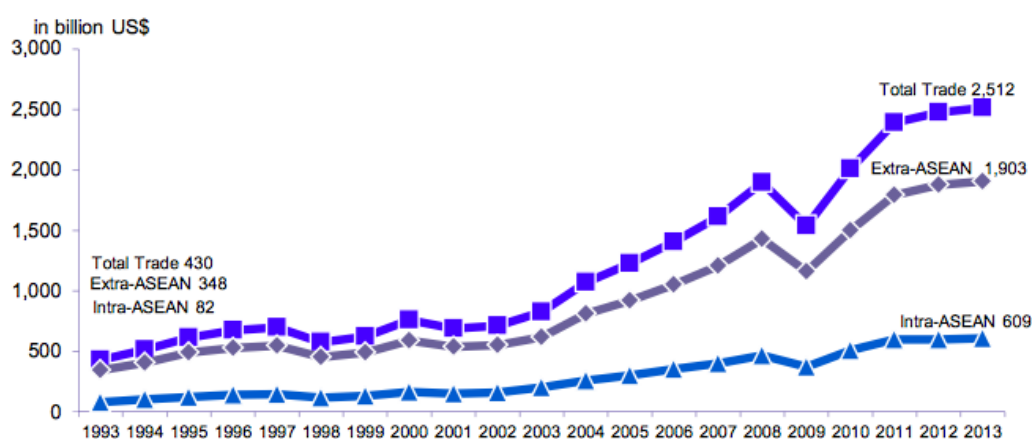
ASEAN is a vibrant region of 600 million people with a gross domestic product of US\$2.6 trillion and total trade of US\$2.6 trillion. AEC is crucial for ASEAN to facilitate the realization of ASEAN regional economic integration. Economic Integration will then assist ASEAN to achieve competitive growth and to spur domestic economic development supported by infrastructure and communications networks as well movement of people, goods and services within the region. Note also that ASEAN is situated at the heart of an economically vibrant and growing region bounded by India in the West; China, Japan and South Korea in the Northeast; and Australia and New Zealand in the South. Enhanced regional integration can potentially place ASEAN at the center of growth and development.

Since 2008, there have been a total of 458 out of 506 or 90.5% of AEC Scorecard measures and prioritised key deliverables that have been implemented. Although ASEAN has come long way toward realizing its goal, but is ASEAN likely to achieve the goal of regional economic integration?

As shown in Figure 1, intra-ASEAN trade share grew from 17.0% in 1990 (pre-AFTA) to 24.2% in 2013, representing a significant improvement. However, this trade share is still significantly lower than that of NAFTA and the EU. At the country level, the intra-ASEAN trade share between 2000 and 2014 had declined for Malaysia, the Philippines and Singapore, and increased for the other ASEAN countries. By 2014, dependence on intra-ASEAN trade was highest for Laos (57%) and lowest for Vietnam (15%). As shown in Figure 2, countries show asymmetric

dependence on trade with ASEAN. Brunei Darussalam, Cambodia, and Laos are much more dependent on ASEAN sourcing than ASEAN as a market, while the reverse is true of Singapore, Thailand and Vietnam. The bulk of intra-ASEAN trade (82.8% in 2014 compared to 87.7% in 2011) is accounted for by Indonesia, Malaysia, Singapore, and Thailand, with Singapore alone accounting for 33.2%.

**Figure 1: Trend of ASEAN Total Trade and Intra-Trade, 2003-2013**



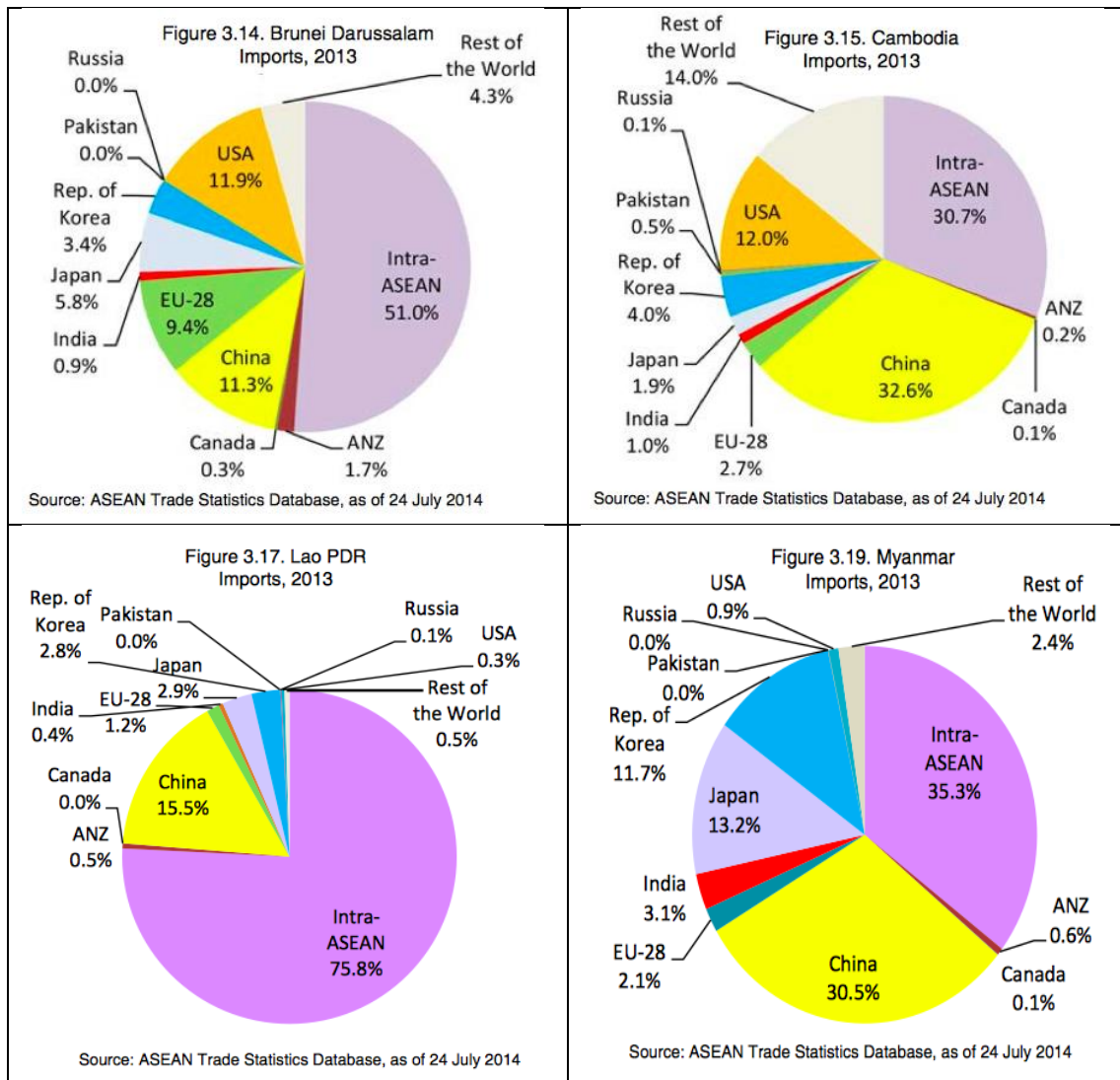
Source: ASEAN Trade Statistics Database, as of 24 July 2014

Note also that while the global economic recovery is expected to continue, the downside risks to ASEAN’s growth have increased arising from the moderating growth momentum in the major emerging market economies such as China, uncertainty in commodity prices and the heightened volatility in financial markets. These are creating strong headwinds in the region, adding pressure to ASEANs struggling exports and weakening growth outlook. The gradual slowdown in the region’s largest economy, Indonesia, continues. GDP rose by 4.7% in the second quarter of this year (on a year earlier). Growth in the region’s second largest economy, Thailand, decelerated to 2.8% in the second quarter of this year (on a year earlier), down from a rate of 3% in the first quarter and well below potential. Malaysia’s economy has also cooled slightly, growing by 4.9% in the second quarter of this year (on a year earlier), down from a rate of 5.6% in the first quarter. Singapore’s economy grew by 1.8% in the second quarter (on a year earlier) and in 2015, it is likely to experience its slowest growth in 6 years. The government has

narrowed its growth forecast range for 2015 from 2-4% to 2-2.5%.

Given the current regional and global economic conditions, the present study aims to measure the progress of regional economic integration by focusing on goods and services markets as well as on financial markets. Specifically, this study intends to address three questions. What is the current degree of trade and financial market relations? Are ASEAN's real and financial markets integrated? Does the economic integration persistent?

**Figure 2: ASEAN's Major Import Origin**



## Methodology

Economic integration is considered in terms of real and financial integrations. Referring to Wong's (1995) study, which relied on increased volume of trade and investment as evidence of increased international integration, Laurenceson (2003) observed such an approach only provided circumstantial evidence and lacked rigorous theoretical basis, rendering the interpretation of results difficult. Instead he adopted empirical tests derived from the international parity conditions: the hypotheses of real interest parity, uncovered interest parity (UIP), purchasing power parity (PPP). Mankin (1994) observed the international parity conditions remained a popular analytical tool to consider economic integration for several reasons: (i) they are fundamental tenets of macro-economic theory; (ii) the results utilizing such fundamental tenets could be more clearly interpreted; and (iii) data for testing are readily available in high frequency.

### *The Methods*

Following Cheung *et al.* (2002) and Laurenceson (2003), real interest parity (RIP) framework has been used. RIP combines both uncovered interest parity (UIP) and purchasing power parity (PPP) as shown below:

$$r_t^{ke} - r_t^{k^*e} = (i_t^k - i_t^{k^*} - \Delta s_{t+k}^e) - (\pi_{t+k}^e - \pi_{t+k}^{*e} - \Delta s_{t+k}^e) \quad (1)$$

where

$r_t^{ke}$  is the expected real interest rate in the domestic country;

$r_t^{k^*e}$  is the expected real interest rate in the foreign country;

$i_t^k$  is the interest rate in the domestic country;

$i_t^{k^*}$  is the interest rate in the foreign country;

$\pi_{t+k}^e$  is the expected inflation rate in the domestic country;

$\pi_{t+k}^{*e}$  is the expected inflation rate in the foreign country; and

$\Delta s_{t+k}^e$  is the expected exchange rate depreciation.

Due to both expected exchange rates and prices are unobservable in the current period, the operational version of Equation 1 based on ex post differentials with the assumption of rational expectations can be expressed as:

$$r_t^k - r_t^{k*} = (i_t^k - i_t^{k*} - \Delta s_{t+k}) - (\pi_{t+k} - \pi_{t+k}^* - \Delta s_{t+k}) \quad (2)$$

where

$$\Delta s_{t+k} = s_{t+k} - s_t ; \text{ and}$$

$$\pi_{t+k} = p_{t+k} - p_t$$

In testing for economic integration, both UIP and PPP represented by  $(i_t^k - i_t^{k*} - \Delta s_{t+k})$  and  $(\pi_{t+k} - \pi_{t+k}^* - \Delta s_{t+k})$ , respectively must hold or in other word stationarity of UIP and PPP are required. In order to find out whether hold or not, this study uses Zivot and Andrews (1992) unit root test with one endogenously determined structural break. The test statistic of this method is then used to test the null hypothesis of PPP or UIP does not hold. If the test statistic is greater than the critical value in absolute term, the null hypothesis of PPP (UIP) does not hold is rejected. This implies that countries are integrated with the flow of goods and services (the flow of financial capital). On the other hand, the null hypothesis of PPP (UIP) does not hold cannot be rejected when the test statistic is smaller than the critical value in absolute term. Therefore, the conclusion is countries are not integrated with the flow of goods and services (the flow of financial capital).

### *The Data*

This study employs monthly data from January 2000 to June 2015. The description and data source details are indicated in Table 1:

**Table 1: Data Description and Source Details**

<b>Data</b>	<b>Country</b>	<b>Source of data</b>
End-of-period nominal exchange rate	All ASEAN countries	International Financial Statistics (IFS), IMF
Consumer price index	All ASEAN countries	IFS, IMF
Money market rate	Indonesia, Malaysia, the Philippines, Thailand and Singapore	IFS, IMF
Lending rate	Cambodia, Myanmar and Vietnam	IFS, IMF
Lending rate	Lao PDR	Bank of Lao PDR
Deposit rate	Brunei Darussalam	IFS, IMF

### **Empirical Results**

Prior to the tests for economic integration, this section assesses the degree of trade relations and interest rate comovement. Figure 3 shows each country's trade intensity series. The trade intensity series are generated by:

$$X_{ij,t} = (Ex_{ij,t} + Ex_{ji,t}) / (\text{ASEAN's total world trade}) \quad (3)$$

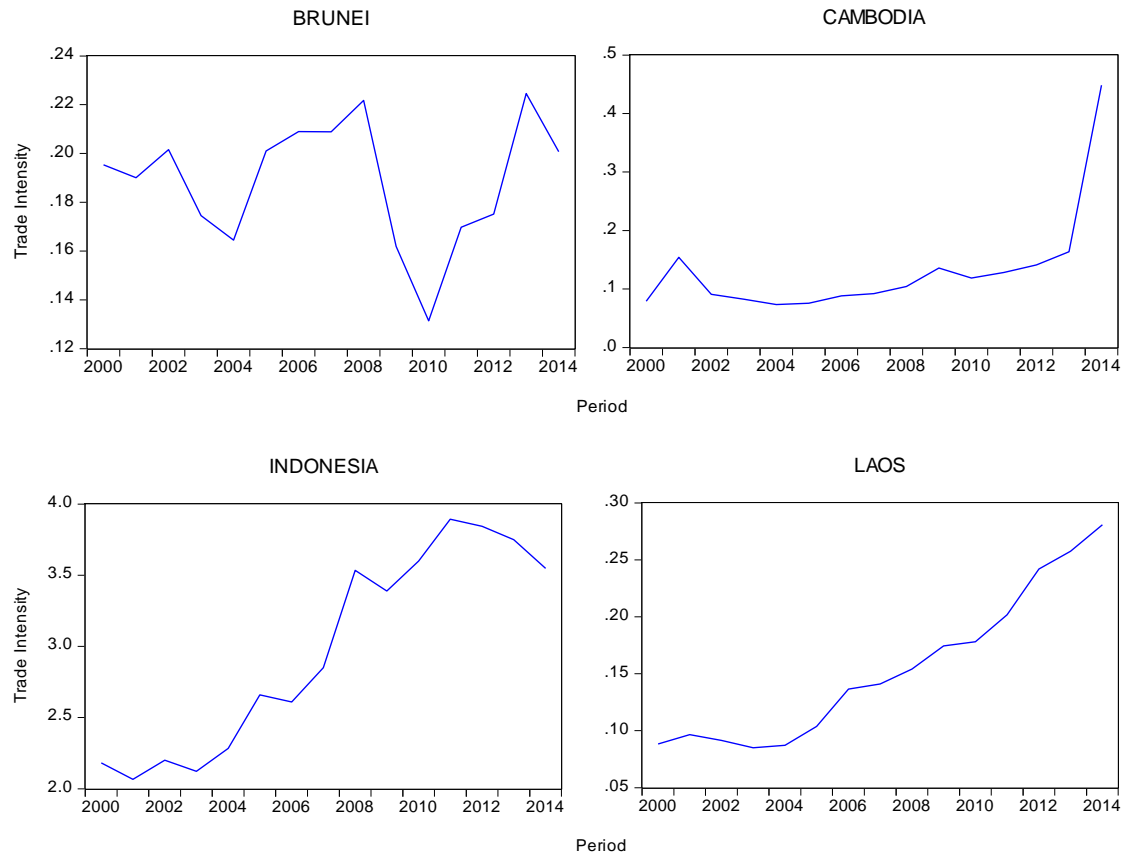
where  $X_{ij,t}$  measures trade intensity for country  $i$ ,  $Ex_{ij,t}$  denotes country  $i$ 's total exports to ASEAN countries,  $Ex_{ji,t}$  denotes country  $i$ 's total imports from ASEAN countries. The intensity is scaled by 100 to make it a percentage of the total ASEAN GDP.

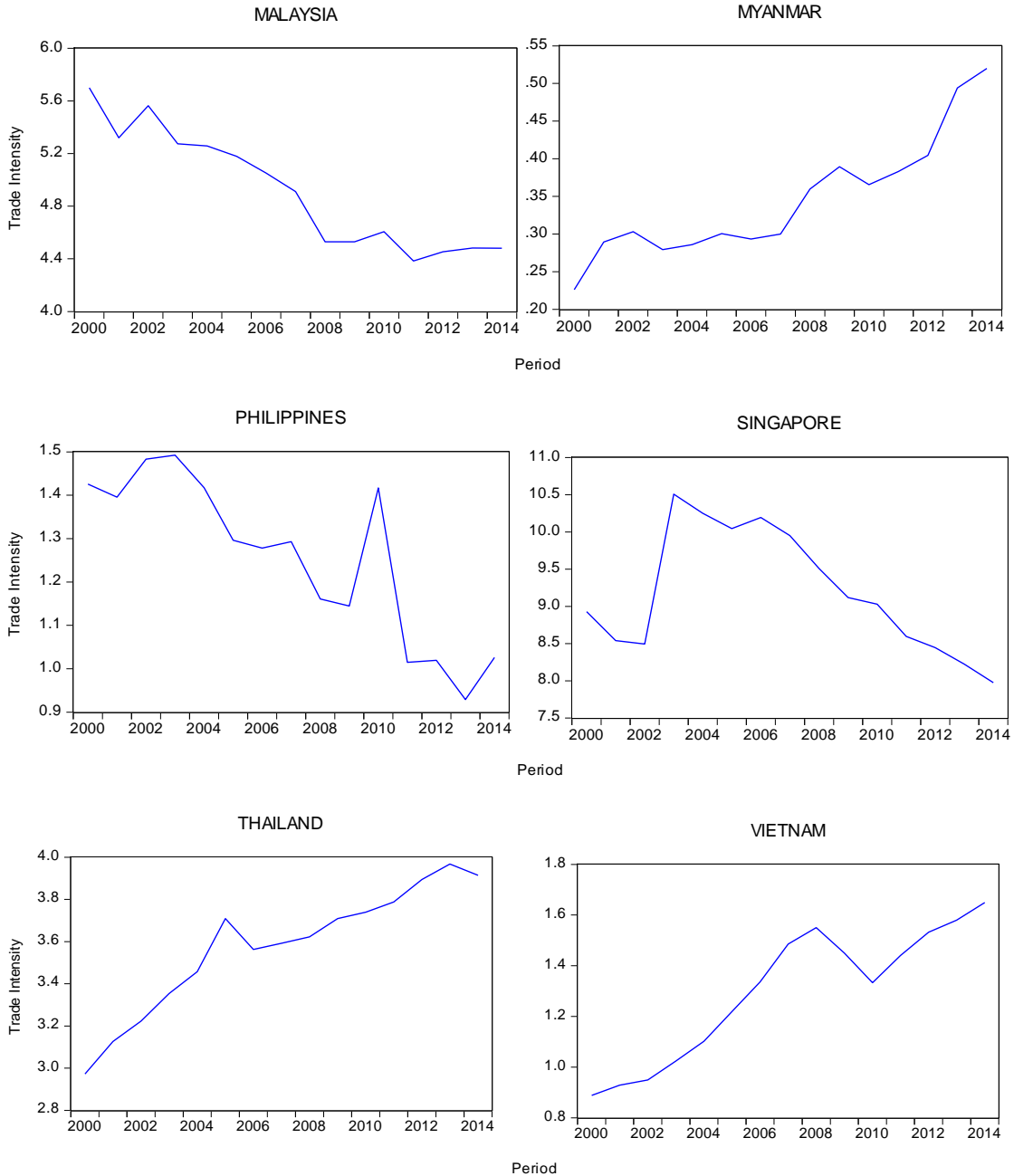
Figure 3 shows that the trade of Cambodia, Indonesia, Laos, Myanmar and Vietnam with their ASEAN partners grew significantly for the period 2000 – 2014, while Malaysia, Singapore and Thailand remained the most important trading partners in this region.

Tables 2 and 3 show the correlation coefficients of interest rates amongst ASEAN countries during the periods 2000-2007 and 2008-2015. The results of this analysis indicate that the value of the correlation coefficients increases considerably for 24 out of 45 country pairs. The average value of the entire region increases from 0.28 during

the period 2000-2007 to 0.40 during the period 2008-2015. The overall results indicate that interest rates of Brunei, Cambodia, Indonesia, Laos, Myanmar and the Philippines become more correlated with interest rates of ASEAN countries.

**Figure 3: ASEAN's Trade Intensity, 2000 – 2014**





Given the growing connection of trade and interest rates, the next concern of this study is to examine if it has benefited the regional economic integration. To test for economic integration (real and financial integration), Zivot and Andrews unit root test is conducted for each pair of countries. The results are reported in Tables 4. In the case of PPP series, the null hypothesis of a unit root is rejected in all country pairs, except Laos-Myanmar, at high levels of statistical significance, implying that the deviations from PPP are stationary and tend to disappear over time. This suggests that real integration strongly holds amongst ASEAN countries. However, in the case of

UIP, evidence of UIP is relatively weak compared to PPP. In total there are 35 out of 45 country pairs support the UIP. All in all, although there is evidence that PPP and UIP hold in ASEAN region, it appears that real integration has progressed further than financial integration.

To validate the PPP and UIP conditions, this study tests the persistence of the deviations from PPP and interest differentials using the equation below:

$$d_t = b_0 + \sum_{k=1}^p b_k d_{t-k} + e_t \quad (4)$$

where  $d$  measures the deviations from PPP and interest differentials.

Under UIP (PPP) condition, the interest differentials (the deviations from PPP) is random, has a zero mean, and cannot be predicted by available information. Thus, if the parity condition is significantly persistent, interest differentials (the deviations from PPP) is predictable and the markets are not efficient. This is considered as evidence against the validity of the parity conditions.

Tables 5 and 6 show the persistency test for the deviations from PPP and interest differentials respectively. The results demonstrate that 10 out of 44 PPP deviations can be predicted by available information. These are considered as evidence against the validity of PPP condition. However, in the case of UIP, only 7 out of 34 interest differentials cannot be predicted by available information and the markets are efficient. The results indicate that while the real integration has progressed well, financial markets in ASEAN region are less integration compared to the real integration.

**Table 2: Interest Rates Correlation for the period January 2000 – December 2007**

	Brunei	Cambodia	Indonesia	Laos	Myanmar	Malaysia	Philippines	Singapore	Thailand	Vietnam
Brunei	1.000									
Cambodia	-0.428	1.000								
Indonesia	-0.329	-0.277	1.000							
Laos	-0.379	0.804	-0.203	1.000						
Myanmar	0.508	-0.681	-0.008	-0.549	1.000					
Malaysia	0.480	-0.893	0.290	-0.699	0.747	1.000				
Philippines	-0.347	-0.197	0.690	-0.097	-0.035	0.201	1.000			
Singapore	-0.021	-0.628	0.618	-0.549	0.301	0.578	0.702	1.000		
Thailand	0.182	-0.796	0.564	-0.653	0.534	0.817	0.588	0.894	1.000	
Vietnam	0.144	-0.716	0.451	-0.795	0.440	0.631	0.357	0.803	0.843	1.000

**Table 3: Interest Rates Correlation for the period January 2008 – June 2015**

	Brunei	Cambodia	Indonesia	Laos	Myanmar	Malaysia	Philippines	Singapore	Thailand	Vietnam
Brunei	1.000									
Cambodia	0.795	1.000								
Indonesia	0.866	0.655	1.000							
Laos	0.916	0.727	0.869	1.000						
Myanmar	0.778	0.964	0.677	0.689	1.000					
Malaysia	-0.028	-0.285	0.064	0.167	-0.346	1.000				
Philippines	0.709	0.840	0.525	0.712	0.763	-0.011	1.000			
Singapore	0.724	0.444	0.526	0.706	0.404	0.305	0.480	1.000		
Thailand	-0.028	-0.149	-0.044	0.144	-0.278	0.842	0.213	0.254	1.000	
Vietnam	0.225	0.478	0.169	0.294	0.432	0.276	0.651	0.184	0.516	1.000

**Table 4: Economic Integration between Brunei and ASEAN Economies**

	PPP	UIP
<i>Economic Integration between Brunei and ASEAN Economies:</i>		
Cambodia	-14.6489***	-6.86276***
Indonesia	-9.23253***	-4.95132**
Laos	-13.1379***	-5.18204**
Myanmar	-6.93085***	-4.51583
Malaysia	-12.8464***	-10.2339***
Philippines	-8.34937***	-6.41527***
Singapore	-13.9336***	-4.09933
Thailand	-13.9936***	-5.31892**
Vietnam	-15.4759***	-3.83977
<i>Economic Integration between Cambodia and ASEAN Economies:</i>		
Indonesia	-11.2846***	-5.00936**
Laos	-9.89395***	-4.66894*
Myanmar	-4.8252*	-5.9626***
Malaysia	-10.2559***	-6.63897***
Philippines	-9.0553***	-4.25045
Singapore	-9.46087***	-4.7776*
Thailand	-12.3072***	-4.95453**
Vietnam	-10.2399***	-4.26302
<i>Economic Integration between Indonesia and ASEAN Economies:</i>		
Laos	-10.7848***	-4.76506*
Myanmar	-5.61712***	-6.46392***
Malaysia	-9.31108***	-4.92114*
Philippines	-12.4701***	-6.69208***
Singapore	-10.1541***	-4.75932*
Thailand	-8.89318***	-5.24516**
Vietnam	-10.8051***	-4.02419
<i>Economic Integration between Lao PDR and ASEAN Economies:</i>		
Myanmar	-4.53263	-5.60418***
Malaysia	-12.4961***	-5.86535***
Philippines	-10.5724***	-4.78755*
Singapore	-7.48307***	-3.3838
Thailand	-11.1564***	-4.19029
Vietnam	-9.65683***	-4.92681*

Notes: 1%, 5% and 10% critical values are -5.34, -4.93 and -4.58 respectively. \*\*\*, \*\* and \* denotes 1%, 5% and 10% significance levels respectively.

**Table 4: Continued**

	<b>PPP</b>	<b>UIP</b>
<b><i>Economic Integration between Myanmar and ASEAN Economies:</i></b>		
Malaysia	-4.89039*	-5.21147**
Philippines	-6.47551***	-7.17143***
Singapore	-6.56735***	-4.31179
Thailand	-6.13597***	-5.00929**
Vietnam	-4.74361*	-4.67527*
<b><i>Economic Integration between Malaysia and ASEAN Economies:</i></b>		
Philippines	-9.34349***	-7.57888***
Singapore	-8.36254***	-6.24123***
Thailand	-13.4821***	-8.32151***
Vietnam	-14.54***	-5.71764***
<b><i>Economic Integration between the Philippines and ASEAN Economies:</i></b>		
Singapore	-8.47258***	-7.36903***
Thailand	-13.3188***	-7.27811***
Vietnam	-14.5592***	-5.72213***
<b><i>Economic Integration between Singapore and ASEAN Economies:</i></b>		
Thailand	-15.1836***	-6.78841***
Vietnam	-15.9377***	-4.25999
<b><i>Economic Integration between Thailand and Vietnam:</i></b>		
Vietnam	-13.6643***	-4.90664*

Notes: 1%, 5% and 10% critical values are -5.34, -4.93 and -4.58 respectively. \*\*\*, \*\* and \* denotes 1%, 5% and 10% significance levels respectively.

**Table 5: A Summary of the Persistence of PPP Deviations**

	Brunei	Cambodia	Indonesia	Laos	Myanmar	Malaysia	Philippines	Singapore	Thailand	Vietnam
Brunei										
Cambodia	-14.65***									
Indonesia	-9.23***	-11.29***								
Laos	-13.14***	-9.89***	-10.79***							
Myanmar	-6.93***	-4.83*	-5.62***	-4.53						
Malaysia	-12.85***	-10.26***	-9.31***	-12.50***	-4.89*					
Philippines	-8.35***	-9.06***	-12.47***	-10.57***	-6.48***	-9.34***				
Singapore	-13.93***	-9.46***	-10.15***	-7.48***	-6.57***	-8.36***	-8.47***			
Thailand	-13.99***	-12.30***	-8.89***	-11.15***	-6.14***	-13.48***	-13.32***	-15.18***		
Vietnam	-15.48***	-10.24***	-10.81***	-9.66***	-4.74*	-14.54***	-14.56***	-15.94***	-13.66***	

Notes: The grey-shaded sections denote the persistence of the deviations from PPP. The full results appear in Appendix

**Table 6: A Summary of the Persistence of Interest Differentials**

	Brunei	Cambodia	Indonesia	Laos	Myanmar	Malaysia	Philippines	Singapore	Thailand	Vietnam
Brunei										
Cambodia	-6.86***									
Indonesia	-4.95**	-5.01**								
Laos	-5.18**	-4.67*	-4.77*							
Myanmar		-5.96***	-6.46***	-5.60***						
Malaysia	-10.23***	-6.64***	-4.92*	-5.87***	-5.21**					
Philippines	-6.42***		-6.69***	-4.79*	-7.17***	-7.58***				
Singapore		-4.78*	-4.76*			-6.24***	-7.37***			
Thailand	-5.32**	-4.96**	-5.25**		-5.01**	-8.32***	-7.28***	-6.79***		
Vietnam				-4.93*	-4.67*	-5.72***	-5.72***			

Notes: The grey-shaded sections denote the persistence of interest rate differentials. The full results appear in Appendix.

## **Conclusion**

This study examines the degree of economic integration in the ASEAN region by focusing on goods and services markets as well as on financial markets. Analyses are conducted for checking whether there existed international parity conditions in terms of UIP differentials and whether the PPP differentials for each pair of countries are zero-mean time series. The Zivot and Andrews unit root test conducted in regard to stationarity requirement of UIP and PPP show that while PPP holds, there is less strong indication for UIP holding. The same result is confirmed when the tests for persistence of UIP and PPP differentials are conducted.

The implication of the findings is that although the degree of financial integration between amongst ASEAN countries is limited, the gains in future will be substantially large. Further liberalization efforts under ASEAN Banking Integration Framework, which aims to liberalize the banking market by 2020, could result in a larger sized market and strengthen their economic integration.

The conclusion of the study is that although the region is already relatively integrated in goods and services, financial integration is weak. The policy implications are: (i) impact of future liberalization is likely to be substantial on financial markets; (ii) the pace of financial sector liberalization should be stepped up; and (iii) capital mobility amongst ASEAN economies should be promoted by dismantling the existing barriers.

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## Appendix A: The Persistence of the Deviations from PPP

**Table A.1: Tests for Persistence of PPP Deviations: Brunei and ASEAN**

	Brunei-Cambodia		Brunei-Indonesia		Brunei-Laos	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
AR(1)	-0.078	(0.076)	0.044	(0.075)	0.018	(0.075)
AR(2)	--	--	--	--	--	--
AR(3)	--	--	--	--	--	--
AR(4)	--	--	--	--	--	--
AR(5)	--	--	--	--	--	--
AR(6)	--	--	--	--	--	--
Adjusted R <sup>2</sup>	0.355		-0.004		-0.005	
	Brunei-Myanmar		Brunei-Malaysia		Brunei-Philippines	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
AR(1)	0.020	(0.075)	0.044	(0.075)	-0.018	(0.075)
AR(2)	--	--	--	--	--	--
AR(3)	--	--	--	--	--	--
AR(4)	--	--	--	--	--	--
AR(5)	--	--	--	--	--	--
AR(6)	--	--	--	--	--	--
Adjusted R <sup>2</sup>	-0.004		-0.004		-0.005	
	Brunei-Singapore		Brunei-Thailand		Brunei-Vietnam	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
AR(1)	-0.293***	(0.073)	-0.053	(0.077)	-0.116	(0.075)
AR(2)	-0.250***	(0.073)	--	--	--	--
AR(3)	--	--	--	--	--	--
AR(4)	--	--	--	--	--	--
AR(5)	--	--	--	--	--	--
AR(6)	--	--	--	--	--	--
Adjusted R <sup>2</sup>	0.010		-0.003		0.008	

**Table A.2: Tests for Persistence of PPP Deviations: Cambodia and ASEAN**

	Cambodia-Indonesia		Cambodia-Laos		Cambodia-Myanmar	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
AR(1)	0.072	(0.073)	0.206***	(0.073)	0.061	(0.075)
AR(2)	-0.168**	(0.073)	--	--	--	--
AR(3)	--	--	--	--	--	--
AR(4)	--	--	--	--	--	--
AR(5)	--	--	--	--	--	--
AR(6)	--	--	--	--	--	--
Adjusted R <sup>2</sup>	0.021		0.038		-0.002	
	Cambodia-Malaysia		Cambodia-Philippines		Cambodia-Singapore	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
AR(1)	0.021	(0.074)	0.028	(0.074)	-0.143*	(0.073)
AR(2)	--	--	--	--	--	--
AR(3)	--	--	--	--	--	--
AR(4)	--	--	--	--	--	--
AR(5)	--	--	--	--	--	--
AR(6)	--	--	--	--	--	--
Adjusted R <sup>2</sup>	-0.005		-0.005		0.015	
	Cambodia-Thailand		Cambodia-Vietnam			
	Coefficient	S.E.	Coefficient	S.E.		
AR(1)	0.106	(0.074)	0.318	(0.074)		
AR(2)	--	--	0.026	(0.074)		
AR(3)	--	--	--	--		
AR(4)	--	--	--	--		
AR(5)	--	--	--	--		
AR(6)	--	--	--	--		
Adjusted R <sup>2</sup>	0.006		0.098			

**Table A.3: Tests for Persistence of PPP Deviations: Indonesia and ASEAN**

	Indonesia-Laos		Indonesia-Myanmar		Indonesia-Malaysia	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
AR(1)	0.116	(0.075)	0.004	(0.075)	0.129*	(0.075)
AR(2)	--	--	--	--	-0.154**	(0.074)
AR(3)	--	--	--	--	-0.109	(0.074)
AR(4)	--	--	--	--	--	--
AR(5)	--	--	--	--	--	--
AR(6)	--	--	--	--	--	--
Adjusted R <sup>2</sup>	0.007835		-0.006		0.040	
	Indonesia-Philippines		Indonesia-Singapore		Indonesia-Thailand	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
AR(1)	0.103	(0.074)	0.079	(0.074)	0.031	(0.073)
AR(2)	--	--	--	--	-0.162**	(0.072)
AR(3)	--	--	--	--	-0.206***	(0.073)
AR(4)	--	--	--	--	--	--
AR(5)	--	--	--	--	--	--
AR(6)	--	--	--	--	--	--
Adjusted R <sup>2</sup>	0.005		0.001		0.060	
	Indonesia-Vietnam					
	Coefficient	S.E.				
AR(1)	0.085	(0.074)				
AR(2)	--	--				
AR(3)	--	--				
AR(4)	--	--				
AR(5)	--	--				
AR(6)	--	--				
Adjusted R <sup>2</sup>	0.002					

**Table A.4: Tests for Persistence of PPP Deviations: Laos and ASEAN**

	Laos-Myanmar		Laos-Malaysia		Laos-Philippines	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
AR(1)	0.079	(0.075)	0.005	(0.076)	0.122	(0.075)
AR(2)	--	--	--	--	--	--
AR(3)	--	--	--	--	--	--
AR(4)	--	--	--	--	--	--
AR(5)	--	--	--	--	--	--
AR(6)	--	--	--	--	--	--
Adjusted R <sup>2</sup>	0.001		-0.006		0.009	
	Laos-Singapore		Laos-Thailand		Laos-Vietnam	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
AR(1)	-0.012	(0.075)	0.143*	(0.074)	0.068	0.075
AR(2)	-0.006	(0.076)	--	--	--	--
AR(3)	--	--	--	--	--	--
AR(4)	--	--	--	--	--	--
AR(5)	--	--	--	--	--	--
AR(6)	--	--	--	--	--	--
Adjusted R <sup>2</sup>	-0.011		0.015		-0.001	

**Table 1.5: Tests for Persistence of PPP Deviations: Myanmar and ASEAN**

	Myanmar-Malaysia		Myanmar-Philippines		Myanmar-Singapore	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
AR(1)	-0.006	(0.075)	-0.005	(0.075)	-0.006	(0.075)
AR(2)	--	--	--	--	--	--
AR(3)	--	--	--	--	--	--
AR(4)	--	--	--	--	--	--
AR(5)	--	--	--	--	--	--
AR(6)	--	--	--	--	--	--
Adjusted R <sup>2</sup>	-0.006		-0.006		-0.006	
	Myanmar-Thailand		Myanmar-Vietnam			
	Coefficient	S.E.	Coefficient	S.E.		
AR(1)	-0.006	(0.075)	-0.005	0.075		
AR(2)	--	--	--	--		
AR(3)	--	--	--	--		
AR(4)	--	--	--	--		
AR(5)	--	--	--	--		
AR(6)	--	--	--	--		
Adjusted R <sup>2</sup>	-0.006		-0.006			

**Table A.6: Tests for Persistence of PPP Deviations: Malaysia and ASEAN**

	Malaysia-Philippines		Malaysia-Singapore		Malaysia-Thailand	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
AR(1)	0.047	(0.074)	0.035	(0.075)	0.014	(0.075)
AR(2)	--	--	--	--	--	--
AR(3)	--	--	--	--	--	--
AR(4)	--	--	--	--	--	--
AR(5)	--	--	--	--	--	--
AR(6)	--	--	--	--	--	--
Adjusted R <sup>2</sup>	-0.003		-0.004		-0.005	
	Malaysia-Vietnam					
	Coefficient	S.E.				
AR(1)	-0.023	(0.074)				
AR(2)	--	--				
AR(3)	--	--				
AR(4)	--	--				
AR(5)	--	--				
AR(6)	--	--				
Adjusted R <sup>2</sup>	-0.005					

**Table A.7: Tests for Persistence of PPP Deviations: the Philippines and ASEAN**

	Philippines-Singapore		Philippines-Thailand		Philippines-Vietnam	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
AR(1)	-0.037	0.075	0.033	(0.074)		
AR(2)	--	--	--	--		
AR(3)	--	--	--	--		
AR(4)	--	--	--	--		
AR(5)	--	--	--	--		
AR(6)	--	--	--	--		
Adjusted R <sup>2</sup>	-0.004		-0.004			

**Table A.8: Tests for Persistence of PPP Deviations: Singapore and ASEAN**

	Singapore-Thailand		Singapore-Vietnam			
	Coefficient	S.E.	Coefficient	S.E.		
AR(1)	-0.087	(0.074)	-0.131	(0.074)		
AR(2)	--	--	--	--		
AR(3)	--	--	--	--		
AR(4)	--	--	--	--		
AR(5)	--	--	--	--		
AR(6)	--	--	--	--		
Adjusted R <sup>2</sup>	0.002		0.012			

**Table A.9: Tests for Persistence of PPP Deviations: Thailand and ASEAN**

	Thailand-Vietnam					
	Coefficient	S.E.				
AR(1)	0.003	(0.074)				
AR(2)	--	--				
AR(3)	--	--				
AR(4)	--	--				
AR(5)	--	--				
AR(6)	--	--				
Adjusted R <sup>2</sup>	-0.005514					

## Appendix B: The Persistence of Interest Rate Differentials

**Table B.1: Tests for Persistence of Interest Differentials: Brunei and ASEAN**

	Brunei-Cambodia		Brunei-Indonesia		Brunei-Laos	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
AR(1)	0.131*	(0.070)	0.296***	(0.075)	0.320***	(0.076)
AR(2)	0.264***	(0.068)	0.089	(0.077)	0.306***	(0.078)
AR(3)	0.386***	(0.072)	0.104	(0.076)	0.298***	(0.077)
AR(4)	--	--	0.081	(0.076)	--	--
AR(5)	--	--	0.162**	(0.076)	--	--
AR(6)	--	--	0.156**	(0.077)	--	--
Adjusted R <sup>2</sup>	0.355		0.425		0.750	
	Brunei-Myanmar		Brunei-Malaysia		Brunei-Philippines	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
AR(1)	0.046	(0.074)	0.107	(0.075)	0.365***	(0.068)
AR(2)	--	--	--	--	0.429***	(0.068)
AR(3)	--	--	--	--	--	--
AR(4)	--	--	--	--	--	--
AR(5)	--	--	--	--	--	--
AR(6)	--	--	--	--	--	--
Adjusted R <sup>2</sup>	-0.003		0.005		0.506	
	Brunei-Singapore		Brunei-Thailand		Brunei-Vietnam	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
AR(1)	0.418***	(0.075)	0.227***	(0.069)	0.367***	(0.075)
AR(2)	0.392***	(0.075)	0.342***	(0.070)	0.244***	(0.078)
AR(3)	0.152**	(0.075)	--	--	0.154***	(0.075)
AR(4)	--	--	--	--	--	--
AR(5)	--	--	--	--	--	--
AR(6)	--	--	--	--	--	--
Adjusted R <sup>2</sup>	0.898				0.421	

**Table B.2: Tests for Persistence of Interest Differentials: Cambodia and ASEAN**

	Cambodia-Indonesia		Cambodia-Laos		Cambodia-Myanmar	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
AR(1)	0.348***	(0.076)	0.305***	(0.077)	0.951	(0.074)
AR(2)	0.020	(0.080)	0.056	(0.089)	--	--
AR(3)	0.155**	(0.078)	0.274***	(0.077)	--	--
AR(4)	0.026	(0.078)	--	--	--	--
AR(5)	0.142*	(0.077)	--	--	--	--
AR(6)	0.161**	(0.077)	--	--	--	--
Adjusted R <sup>2</sup>	0.305		0.734		0.002	
	Cambodia-Malaysia		Cambodia-Philippines		Cambodia-Singapore	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
AR(1)	0.254***	(0.071)	4.117***	(0.073)	0.124***	(0.070)
AR(2)	0.162***	(0.073)	0.233*	(0.075)	0.220***	(0.069)
AR(3)	0.339***	(0.075)	0.143***	(0.074)	0.360***	(0.073)
AR(4)	--	--	--	--	--	--
AR(5)	--	--	--	--	--	--
AR(6)	--	--	--	--	--	--
Adjusted R <sup>2</sup>	0.350		0.184		0.256	
	Cambodia-Thailand		Cambodia-Vietnam			
	Coefficient	S.E.	Coefficient	S.E.		
AR(1)	1.588***	(0.076)	0.719***	(0.075)		
AR(2)	0.393	(0.079)	0.007	(0.088)		
AR(3)	0.010***	(0.076)	0.402***	(0.088)		
AR(4)	0.209	(0.077)	-0.223***	(0.075)		
AR(5)	0.004	(0.076)	--	--		
AR(6)	0.071**	(0.075)	--	--		
Adjusted R <sup>2</sup>	0.568		0.793			

**Table B.3: Tests for Persistence of Interest Differentials: Indonesia and ASEAN**

	Indonesia-Laos		Indonesia-Myanmar		Indonesia-Malaysia	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
AR(1)	0.389***	(0.081)	0.112	(0.075)	0.559***	(0.061)
AR(2)	-0.027	(0.085)	--	--	--	--
AR(3)	0.257***	(0.085)	--	--	--	--
AR(4)	0.145*	(0.079)	--	--	--	--
AR(5)	--	--	--	--	--	--
AR(6)	--	--	--	--	--	--
Adjusted R <sup>2</sup>	0.412		0.007		0.309	
	Indonesia-Philippines		Indonesia-Singapore		Indonesia-Thailand	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
AR(1)	0.415***	(0.074)	0.336***	(0.074)	0.317***	(0.076)
AR(2)	0.167**	(0.074)	0.071	(0.078)	0.052	(0.079)
AR(3)	--	--	0.119	(0.077)	0.088	(0.078)
AR(4)	--	--	0.052	(0.078)	0.087	(0.078)
AR(5)	--	--	0.215**	(0.073)	0.108	(0.078)
AR(6)	--	--	--	--	0.122	(0.079)
Adjusted R <sup>2</sup>	0.261		0.359		0.410	
	Indonesia-Vietnam					
	Coefficient	S.E.				
AR(1)	0.447***	(0.076)				
AR(2)	0.002	(0.083)				
AR(3)	0.189**	(0.082)				
AR(4)	0.043	(0.083)				
AR(5)	0.155**	(0.076)				
AR(6)	--	--				
Adjusted R <sup>2</sup>	0.478					

**Table B.4: Tests for Persistence of Interest Differentials: Laos and ASEAN**

	Laos-Myanmar		Laos-Malaysia		Laos-Philippines	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
AR(1)	0.124	(0.080)	0.324***	(0.081)	0.490***	(0.080)
AR(2)	--	--	0.109	(0.086)	0.185**	(0.089)
AR(3)	--	--	0.163*	(0.086)	0.154*	(0.079)
AR(4)	--	--	0.075	(0.086)	--	--
AR(5)	--	--	0.049	(0.087)	--	--
AR(6)	--	--	0.232***	(0.082)	--	--
Adjusted R <sup>2</sup>	0.009		0.754		0.561	
	Laos-Singapore		Laos-Thailand		Laos-Vietnam	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
AR(1)	0.317***	(0.077)	0.403***	0.080	0.996***	(0.078)
AR(2)	0.296***	(0.078)	0.055	0.087	0.018	(0.111)
AR(3)	0.289***	(0.077)	0.122	0.086	-0.028	(0.078)
AR(4)	--	--	0.124	0.086	--	--
AR(5)	--	--	0.041	0.086	--	--
AR(6)	--	--	0.233***	0.079	--	--
Adjusted R <sup>2</sup>	0.691		0.849		0.964	

**Table B.5: Tests for Persistence of Interest Differentials: Myanmar and ASEAN**

	Myanmar-Malaysia		Myanmar-Philippines		Myanmar-Singapore	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
AR(1)	-0.005	(0.074)	-0.005	(0.074)	-0.005	(0.074)
AR(2)	--	--	--	--	--	--
AR(3)	--	--	--	--	--	--
AR(4)	--	--	--	--	--	--
AR(5)	--	--	--	--	--	--
AR(6)	--	--	--	--	--	--
Adjusted R <sup>2</sup>	-0.005		-0.005		-0.005464	
	Myanmar-Thailand		Myanmar-Vietnam			
	Coefficient	S.E.	Coefficient	S.E.		
AR(1)	-0.005	(0.074)	-0.005	(0.075)		
AR(2)	--	--	--	--		
AR(3)	--	--	--	--		
AR(4)	--	--	--	--		
AR(5)	--	--	--	--		
AR(6)	--	--	--	--		
Adjusted R <sup>2</sup>	-0.005		-0.006			

**Table B.6: Tests for Persistence of Interest Differentials: Malaysia and ASEAN**

	Malaysia-Philippines		Malaysia-Singapore		Malaysia-Thailand	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
AR(1)	0.363***	(0.074)	0.340***	0.075	0.211***	(0.074)
AR(2)	0.262***	(0.077)	0.064	0.079	0.130*	(0.074)
AR(3)	0.146*	(0.075)	0.208***	0.075	--	--
AR(4)	--	--	--	--	--	--
AR(5)	--	--	--	--	--	--
AR(6)	--	--	--	--	--	--
Adjusted R <sup>2</sup>	0.438		0.226			
	Malaysia-Vietnam					
	Coefficient	S.E.				
AR(1)	0.515	(0.074)				
AR(2)	0.217	(0.074)				
AR(3)	--	--				
AR(4)	--	--				
AR(5)	--	--				
AR(6)	--	--				
Adjusted R <sup>2</sup>	0.453					

**Table B.7: Tests for Persistence of Interest Differentials: the Philippines and ASEAN**

	Philippines-Singapore		Philippines-Thailand		Philippines-Vietnam	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
AR(1)	0.290***	(0.071)	0.361***	(0.074)	0.446***	(0.075)
AR(2)	0.345***	(0.071)	0.278***	(0.076)	0.260***	(0.080)
AR(3)	--	--	0.193***	(0.074)	0.145*	(0.075)
AR(4)	--	--	--	--	--	--
AR(5)	--	--	--	--	--	--
AR(6)	--	--	--	--	--	--
Adjusted R <sup>2</sup>	0.277		0.539			

**Table B.8: Tests for Persistence of Interest Differentials: Singapore and ASEAN**

	Singapore-Thailand		Singapore-Vietnam			
	Coefficient	S.E.	Coefficient	S.E.		
AR(1)	0.211***	(0.074)	0.392***	0.075		
AR(2)	0.303***	(0.072)	0.243***	0.079		
AR(3)	0.091	(0.075)	0.181**	0.075		
AR(4)	--	--	--	--		
AR(5)	--	--	--	--		
AR(6)	--	--	--	--		
Adjusted R <sup>2</sup>	0.215		0.514			

**Table B.9: Tests for Persistence of Interest Differentials: Thailand and ASEAN**

	Thailand-Vietnam					
	Coefficient	S.E.				
AR(1)	0.464***	0.075				
AR(2)	0.133	0.082				
AR(3)	0.157**	0.075				
AR(4)	--	--				
AR(5)	--	--				
AR(6)	--	--				
Adjusted R <sup>2</sup>	0.427					