# Time-Varying Integration Among Asean-5 Economies

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**Abstract -** This study explores the economic integration among the ASEAN-5 economies over two sample periods; the pre-crisis period (1990 to 1996) and post-crisis period (2000 to 2006). Using the output-price approach, it attempts to determine if the nature of integration among these economies has changed due to the Asian financial crisis in 1997. In methodology, the study adopts the Autoregressive Distributed Lag (ARDL) approach and Vector Error Correction Model (VECM). The results show that the crisis has a deep imprint on the degree of economic integration among these countries. The results provide important inputs for macroeconomic policy formulation at the regional level.

 **Keywords**    : Economic integration; ASEAN; Financial crisis; ARDL; VECM
 **Paper Type** : Research Paper

## Introduction

The commitment of the Association of Southeast Asian Nation (ASEAN) to achieve greater economic integration is well-reflected by the various efforts aimed towards this direction. Of particular importance is the establishment of the ASEAN Vision 2020 which intends to achieve a holistic growth of ASEAN in general. By 2020, ASEAN is envisioned to achieve a greater degree of economic integration where member countries would be able to share synergistic relationships in order to create an outward- and forward-looking ASEAN. In realizing this vision, in December 1998, member nations concluded the Hanoi Plan of Action which outlined several major initiatives to promote economic integration within the region. Subsequently in October 2003 at the Ninth ASEAN Summit in Bali, the member nations decided to form the ASEAN Economic Community (AEC) by 2020. The realization of the AEC would bring the ASEAN economic integration to greater heights with the AEC to be a single market and production base that would facilitate free flow of goods, services, investments, capital and skilled labor.

Ever since its launch in October 2003, the AEC has captured substantial research interests particularly on its viability and the possibility of regional policy harmonization in the context of a higher level economic integration. There is also a rich literature on the ASEAN economic integration focusing on the trade and investment aspects of integration. For instance, Rana (2006) finds increased integration among the ASEAN countries as reflected by the higher trade activities among the countries. In particular, trade integration among the ASEAN countries has increased from 17.9 percent in 1980 to 24.0 percent in 2005, indicating that these countries have become increasingly dependent on each other for trade. Kawai (2002) arrives at similar findings that the integration among the ASEAN economies has increased as reflected by the higher intra-regional trade from 35 percent of total East Asian trade in 1980 to 54 percent in 2003. Meanwhile, several other studies analyze the integration among the ASEAN economies based on the financial integration aspect. For instance, by analyzing the stock market integration among the ASEAN economies, Click and Plummer (2009) document that the financial integration among the ASEAN economies has weakened due to the Asian financial crisis in 1997/1998.

An area which is currently lacking in the ASEAN economic integration literature is the determination of integration at the macro-level based on major economic variables such as output and price. The output-price approach in assessing economic integration has been quite commonly adopted in the case of the developed economies. For instance, in the case of the G7 countries, Den Haan and Sumner (2001) study the short-run and long-run co-movements between output and price levels in Canada, France, Germany, Italy, Japan, United Kingdom and the United States using the VAR forecast errors and frequency domain filters. The study finds several patterns of correlation between output and

price across all the countries. In particular, the output-price relationship is found to be significantly negative in the long run and significantly higher in the short run. Similar approach is adopted by Fiorito and Kollintzas (1994) for the G7 countries, and Backus and Kehoe (1992) for ten OECD countries. These studies provide the support that, for most of the developed countries, prices were pro-cyclical in the earlier times but turned counter-cyclical in the more recent times.

Clear understanding on the relationship between real activity and price is highly relevant in the context of economic grouping since it has important implications for the strategic formulation of possible macroeconomic policy harmonization. Understanding the degree of output and price integration enables policymakers to evaluate the extent of integration among these economies and formulate suitable policy to achieve the intended degree of economic integration. Subsequently, policies to facilitate greater degree of economic integration can be implemented so that policy harmonization in the context of the "economic community" can be realized.

This study aims to assess the economic integration among the ASEAN-5 economies, namely Indonesia, Malaysia, the Philippines, Singapore and Thailand in two sample periods: the pre-crisis period (1990 to 1996) and post-crisis period (2000 to 2006). By comparing the levels of integration in the two sample periods, the study attempts to determine if the nature of integration among these economies has changed due to the financial crisis in 1997. Using output and price as the economic indicators, the study adopts the Autoregressive Distributed Lag (ARDL) approach and Vector Error Correction Model (VECM) to arrive at the empirical evidences. A major point of departure of this study from the existing ones is that it explores the inter-relationship between output and price across the selected countries in the economic grouping. The findings of the study help to provide important inputs for the policymakers to evaluate the possibility of macroeconomic policy harmonization in the ASEAN context.

The rest of the study is organized as follows. Section 2 highlights the data preliminaries and methodology of the study. Section 3 discusses the empirical findings. Finally, section 4 summarizes the major findings and draws relevant policy implications.

## Data And Methodology

In efforts to investigate the degree of integration of output and price among the ASEAN-5 economies, we use the Industrial Production Index (IPI) to represent output and Consumer Price Index (CPI) to represent price. While the data for the CPI are consistently available for all the countries in the study during the period under review, this is not the case for the IPI. In cases where data on IPI are not available, we use the manufacturing index instead. For the case of Thailand where both the data on IPI and manufacturing indices are not available for the period under review, we use the export data as a proxy for real sector output. Price level is defined as inflation which is calculated by changes in the CPI, while real output is derived by taking the logarithm of industrial output divided by inflation. For consistency, all data are gathered from the *International Financial Statistics 2007* database published by the International Monetary Fund.

To determine if the degree of economic integration among these economies has changed since the region was hit by the financial crisis in 1997, the study period which spans from 1990.Q1 to 2006.Q4 is divided into the pre-crisis period (1990.Q1-1996.Q4) and post-crisis period (2000.Q1-2006.Q4). Based on this, we have an even length period of observation of seven years before the crisis and seven years after the crisis. Moreover, the study purposely ends at end-2006 so as not to include the 2007 US sub-prime crisis so as to only account for the crisis which originates from within the region.

## Autoregressive Distributed Lag (ARDL) Bound Testing Approach

The ARDL model is employed to empirically examine the existence of dynamic relationships of outputs and prices among the ASEAN-5 countries. The approach was initially introduced by Pesaran *et al.* (1996) and has numerous advantages. Firstly, unlike the most widely used method for testing cointegration, the ARDL approach can be applied irrespective of whether the series are $I(0)$, $I(1)$, or fractionally integrated (Pesaran and Pesaran 1997; Bahmani-Oskooee and Ng, 2002), thus avoids the problems resulting from non-stationary time series data (Laurenceson and Chai, 2003). Secondly, the ARDL model takes sufficient numbers of lags to capture the data generating process in a general-to-specific modeling framework (Laurenceson and Chai, 2003). Finally, the ARDL approach provides robust results for a smaller sample size of cointegration analysis. Since the sample size of our study is 24 for each period, this provides further motivation to adopt the ARDL model in the analysis.

In this study, the ARDL models used for testing the long-run relationship between outputs and prices across the ASEAN-5 countries can be written as in Equations (1) and (2), respectively:

$$Y_{it} = a_0 + a_1 Y_{ASEANt} + e_t \tag{1}$$

$$INF_{it} = a_0 + a_1 INF_{ASEANt} + e_t \tag{2}$$

where $Y_{it}$ and $INF_{it}$ are real output and inflation for country $i$ (i.e., Indonesia, Malaysia, the Philippines, Singapore and Thailand) at time $t$, $Y_{ASEAN}$ and $INF_{ASEAN}$ are the real output and inflation for ASEAN-5 countries, respectively and $e_t$ is an error term.

The error-correction version of the ARDL framework pertaining to the variables in the Equations (1 and 2) can be reproduced as follows:

$$\Delta Y_{it} = \delta_0 + \sum_{i=1}^{p} \varepsilon_i \Delta Y_{it-i} + \sum_{i=0}^{p} \phi_i \Delta Y_{ASEAN_{t-i}} + \lambda_1 Y_{it-1} + \lambda_2 Y_{ASEAN_{t-1}} + u_{1t} \tag{3}$$

$$\Delta INF_{it} = \delta_0 + \sum_{i=1}^{p} \varepsilon_i \Delta INF_{it-i} + \sum_{i=0}^{p} \phi_i \Delta INF_{ASEAN_{t-i}} + \lambda_1 INF_{it-1} + \lambda_2 INF_{ASEAN_{t-1}} + u_{1t} \tag{4}$$

The terms with the summation signs in the Equations (3 and 4) represent the error-correction dynamic, while the second part (terms with $\lambda s$) correspond to the long-run relationship. The null of no cointegration in the long run relationship is defined by $H_0: \lambda_1 = \lambda_2 = 0$ is tested against the alternative of $H_1: \lambda_1 \neq \lambda_2 \neq 0$, by the means of the familiar F-test. For a small sample size study which is lesser than 80 observations, Narayan (2004) has tabulated two sets of appropriate critical values. Thus, this study uses Narayan (2004) critical values instead of that of Pesaran et al. (1996). One set assumes all variables are $I(1)$ and another assumes that they are all $I(0)$. This provides a bound covering all possible classifications of the variables into $I(1)$ and $I(0)$ or even fractionally integrated. Finally, to determine the optimal lag-length and select the ARDL model, the study employs the Schwartz Bayesian Criteria (SBC).

**Vector Error Correction Model (VECM) Framework**
The study employs the VECM framework to examine the short- and long-run dynamic relationships of the variables among the ASEAN countries. The VECM can therefore be formulated as follows:

$$\Delta Z_t = \delta + \Gamma_i \Delta Z_{t-1} + \ldots + \Gamma_k \Delta Z_{t-k} + \Pi Z_{t-k} + \varepsilon_t \tag{5}$$

where $Z_t$ is an n x 1 vector of variables and $\delta$ is an n x 1 vector of constant, respectively. In our case, $Z_t = (Y, INF)$. $\Gamma$ is an $n \times n$ matrix (coefficients of the short run dynamics), $\Pi = \alpha\beta'$ where $\alpha$ is an $n \times 1$ column vector (the matrix of loadings) represents the speed of short run adjustment to disequilibrium and $\beta'$ is an $1 \times n$ cointegrating row vector (the matrix of cointegrating vectors) indicates the matrix of long run coefficients such that $Z_t$ converge in their long run equilibrium. Finally, $\varepsilon_t$ is an $n \times 1$ vector of white noise error term and $k$ is the order of autoregression.

**Results And Discussions**
**Cointegration Test based on ARDL**
The results of the cointegration test based on the ARDL model are presented in Table 1. By assessing the cointegration property of outputs and prices between the individual country and the rest of the selected countries as a group, we are able to determine if a particular country's output or price is cointegrated with that of the other countries. For the pre-crisis period, the results show that the F-statistics for Malaysia, Singapore and Thailand are significant at lag-length equals to 1 at least at the 10 percent significance level, suggesting that the outputs of these countries have cointegrating relationships with the outputs of the rest of the ASEAN-5 countries. Since the results indicate that the outputs of these countries have long-run equilibrium relationships with the ASEAN-5 countries as a whole, it can be implied that the outputs of Malaysia, Singapore and Thailand are significant in predicting the output of ASEAN-5. However, in the post-crisis period, the results show that only the output of Singapore has cointegrating relationship with

that of ASEAN-5, indicating that the output integration among the ASEAN-5 countries has changed and weakened following the 1997 financial crisis.

**Table 1. F-statistics for ARDL Cointegration Test of Output and Price among ASEAN-5**

| Lag-Length | Pre-Crisis Period | | | | |
|---|---|---|---|---|---|
| | *Real Output* | | | | |
| | **Indonesia** | **Malaysia** | **Philippines** | **Singapore** | **Thailand** |
| 1 | 3.0394 | 6.6842* | 3.2787 | 4.4022** | 6.0795* |
| 2 | 0.2285 | 1.2826 | 0.9001 | 1.6416 | 0.9127 |
| | *Inflation* | | | | |
| 1 | 3.4352 | 2.5922 | 1.5405 | 0.5701 | 1.6728 |
| 2 | 2.4685 | 0.6902 | 1.3724 | 1.7711 | 1.2561 |
| | Post-Crisis Period | | | | |
| | *Real Output* | | | | |
| 1 | 0.4676 | 1.0992 | 1.5494 | 1.1666 | 1.2273 |
| 2 | 0.6743 | 1.7631 | 3.0277 | 5.0319** | 2.7209 |
| | *Inflation* | | | | |
| 1 | 1.8103 | 5.2803** | 3.4056 | 2.7783 | 1.0630 |
| 2 | 2.6454 | 0.8367 | 1.6461 | 0.5171 | 2.6280 |

*Notes*: The relevant critical value bounds are taken from Case II with a restricted intercept and no trend and number of regressors = 4 (Narayan, 2004). They are 4.280 – 5.840 at the 99 percent; 3.058 – 4.223 at the 95 percent; and 2.525 – 3.560 at the 90 percent significance levels respectively. * and ** denote that F-statistics falls above the 90 percent, 95 percent and 99 percent upper bound, respectively.

As for prices, the results of the ARDL test show that there is an increased degree of price integration among the ASEAN-5 after the 1997 crisis. While none of the countries' price level is cointegrated with that of the ASEAN-5 in the pre-crisis period, in the post-crisis period, the price level of Malaysia is shown to be significantly cointegrated with the rest of the ASEAN-5 countries. In essence, this result suggests that the price level of Malaysia is significant is predicting the price level of ASEAN-5 as a group. Learning from the experience during the crisis on how damaging high inflation can be on the real economy, the ASEAN-5 economies seem to be more careful in managing inflation in the post-crisis period, resulting in a stable inflation environment in the region. This is one positive effect that the crisis has on the macroeconomic management of the ASEAN countries.

**Long-Run ARDL Estimates**
Next, we estimate the long-run ARDL model among the outputs and prices of the countries which are shown to be cointegrated with the rest of the ASEAN-5 (Table 2). In the pre-crisis period, the results indicate that Malaysia's output is significant in affecting Singapore's output, vice versa. In other words, there is a bi-directional causation in the outputs of Malaysia and Singapore, mainly due to close trade linkages between the two countries. The results also show that Indonesia's output is significant in

affecting Thailand's output, that an increase in Indonesia's output has a positive association with Thailand's output.

**Table 2. Long Run ARDL Model Estimates among Real Outputs of ASEAN-5**

| Country | Pre-Crisis Period | | | Post-Crisis Period |
|---|---|---|---|---|
| | Malaysia [1,1,0,0,0] | Singapore [0,0,0,0,0] | Thailand [1,0,1,0,0] | Singapore [1,0,0,1,0] |
| **Constant** | -1.5295 (-1.0251) | -1.0111*** (-1.8592) | 4.2737* (6.8295) | -3.2628*** (-1.8707) |
| **Indonesia** | 0.0927 (0.31836) | -0.0720 (-0.6386) | 1.1263*** (1.8098) | -0.3771*** (-2.0484) |
| **Malaysia** | - | 0.4587* (3.4735) | -0.9084 (-1.2389) | -0.0668 (-0.0936) |
| **Philippines** | -0.0407 (-0.0778) | 0.2589 (1.1467) | 0.8543 (1.1860) | 0.1056 (0.2062) |
| **Singapore** | 0.6556*** (1.6900) | - | 1.2295 (1.5507) | - |
| **Thailand** | 0.2825 (0.9635) | 0.1757 (1.6940) | - | 0.6108*** (1.7815) |
| | Adj-R² = 0.904 D-W = 2.4573 | Adj-R² = 0.886 D-W = 1.8910 | Adj-R² = 0.970 D-W = 2.6885 | Adj-R² = 0.930 D-W = 1.9413 |

*Notes*: Figures inside the parentheses are the values of t-ratios. *** and * denotes significance levels at the 1 percent and 10 percent, respectively. Adjusted R² is the adjusted R squared and D-W is the Durbin-Watson d-test for autocorrelation.

In the post-crisis period, there is an indication that Indonesia's output shows significant negative association to that of Singapore, indicating that the weak economic performance of Indonesia is detrimental to the ASEAN-5 economies as a whole and could frustrate the efforts towards business cycle synchronization in the region. There is a significant positive association between the output of Thailand and that of Singapore, while there is no association between the outputs of Malaysia and Singapore as was being the case in the pre-crisis period.

In the case of price integration, the long-run ARDL estimates suggest that Indonesia's and Thailand's price levels are significant in affecting that of Malaysia (Table 3). Since the earlier results have indicated that the Malaysian price level is reflective of that of the ASEAN-5, this also means that the price levels in Indonesia and Thailand are significant in influencing the price level in the ASEAN-5 as a whole. Apart from providing further support for the increased price integration among the ASEAN countries in the post-crisis period, this study documents the increased sensitivity of the neighboring countries to the changes in the price levels in the Indonesian and Thai economies. In this context, coordinated efforts to contain inflation at the regional level will prove to be beneficial for the ASEAN-5 in general.

**Table 3. Long Run ARDL Model Estimates of Inflation among ASEAN-5**

| Country | Post-Crisis Period |
|---|---|
| | Malaysia [0,1,0,0,0] |
| **Constant** | -0.0003 (-0.1608) |

|  |  |
|---|---|
| **Indonesia** | 0.1087** (2.2971) |
| **Philippines** | 0.1161 (1.1907) |
| **Singapore** | -0.1267 (-0.6342) |
| **Thailand** | 0.2255** (2.4257) |
|  | Adj-$R^2$ = 0.280 D-W = 1.8302 |

*Notes*: Figures inside the parentheses are the values of t-ratios. ** denotes significance levels at the 5 percent, respectively. Adjusted $R^2$ is the adjusted R squared and D-W is the Durbin-Watson d-test for autocorrelation.

**Multivariate VECM Causality**

For further inferences, we adopt the multivariate causality analysis based on the VECM which enable us to explore both the short- and long-run dynamics of the outputs and prices among the countries. Here, we regress the changes in both the dependent and independent variables on the lagged deviations as in Equation 5. The estimates of the error correction representations are presented in Table 4. The long-run coefficients reported for all the models are employed to generate the error correction terms. The adjusted-$R^2$ values of more than 0.8 for all the models suggest that such error correction models fit the data reasonably well. In addition, the computed F-statistics clearly reject the null hypothesis that all regressors have zero coefficients for both cases.

**Table 4. Multivariate VECM Causality of Output among ASEAN-5**

| Dependent Variables | Independent Variables | | | | | |
|---|---|---|---|---|---|---|
| | ΔMay | ΔIndo | ΔPhil | ΔSing | ΔThai | ECT$_{t-1}$ |
| **Pre-Crisis Period** | | | | | | |
| ΔMay | - | 0.2037 [0.8181] | 0.8432 [0.4510] | 0.1272 [0.8816] | 0.9584 [0.4073] | -0.0025 (-0.7173) |
| ΔIndo | 0.8634 [0.4430] | - | 1.8158 [0.1990] | 2.5820 [0.1110] | 8.1833*** [0.0044] | -0.0214*** (-4.9628) |
| ΔPhil | 1.8666 [0.1912] | 0.5384 [0.5953] | - | 2.5414 [0.1144] | 2.3645 [0.1304] | -0.0239*** (-4.8415) |
| ΔSing | 0.8076 [0.4656] | 0.4252 [0.6618] | 2.0315 [0.1680] | - | 2.7862* [0.0958] | -0.0039*** (-3.1945) |
| ΔThai | 3.5505* [0.0566] | 0.6558 [0.5342] | 0.4555 [0.6432] | 2.7410* [0.0990] | - | -0.3107* (-1.7946) |
| **Post-Crisis Period** | | | | | | |
| ΔSing | 0.4071 [0.7522] | 0.2545 [0.8561] | 0.4435 [0.7284] | - | 1.5346 [0.2788] | -0.0827** (-2.4291) |
| ΔIndo | 0.3492 [0.7910] | - | 0.1046 [0.9951] | 1.1098 [0.4003] | 0.3565 [0.7861] | -0.1782 (-1.4441) |
| ΔMay | - | 0.2621 [0.8508] | 2.4551* [0.0978] | 0.3077 [0.8194] | 1.1719 [0.3792] | -0.1378 (-0.2753) |

| | | | | | | |
|---|---|---|---|---|---|---|
| **ΔPhil** | 0.7022 [0.5768] | 0.2576 [0.8540] | - | 0.1556 [0.9232] | 0.5582 [0.6573] | -0.3352* (-2.0384) |
| **ΔThai** | 1.4431 [0.3008] | 0.9252 [0.4716] | 0.8423 [0.5081] | 0.7914 [0.5320] | - | 0.2081 (0.3499) |

*Notes*: ***, ** and * represent significance at the 1 per cent, 5 percent and 10 percent levels, respectively. $ECT_{t-1}$ is derived by normalizing the cointegrating vectors on the dependent variables, producing residual *r*. By imposing restriction on the coefficients of each variable and conducting Wald test, we obtain *F*-statistics for each coefficient in all equations. Figures in the parentheses and squared parentheses represent *t*-statistics and probabilities for *F*-statistics, respectively.

Based on this test, the long-run relationship is measured by the error-correction terms (ECTs). The statistically significant ECTs for Indonesia, the Philippines and Singapore in the pre-crisis period suggest that the outputs of all the ASEAN-5 countries are important in affecting these countries' outputs in the long run. However, for Malaysia and Thailand, the outputs of the ASEAN-5 countries are not influential on their outputs in the long run. In the post-crisis period however, the VECM results suggest that the outputs of the ASEAN-5 countries are significant in affecting the output of only two countries, namely Singapore and the Philippines, implying a lesser degree of outputs cointegration of the ASEAN-5 countries in the long run in the post-crisis period. It is important to note that the VECM results are supportive of those of the ARDL model that there is lesser degree of output integration among the ASEAN-5 countries following the crisis in 1997.

The short-run analysis reveals several interesting findings (Table 4). The significance of the individual countries' output in causing the output of the dependent country in the short run is being reflected by the F-statistics stated under the variables' coefficients. The short-run causalities shed some lights on the directions of causation as to which country's output are significant in affecting the output of the other country. In the pre-crisis period, there is a significant short-run causation running from the outputs of Malaysia to Thailand, Singapore to Thailand, Thailand to Indonesia, and Thailand to Singapore. This reflects some degree of economic inter-connection between these ASEAN-5 economies. In the post-crisis period, however, there is only a weak causation running from the Philippines to Malaysia. The earlier short-run causations have been non-existence due to the crisis in 1997.

With regard to prices, it is encouraging to note that the ECTs for all the ASEAN-5 countries are significant, suggesting that the price levels of all ASEAN-5 countries are important in affecting these countries' price levels in the long run (Table 5). This finding is supportive of the earlier results that there is greater degree of price integration among the ASEAN-5 following the crisis in 1997.

**Table 5. Multivariate VECM Causality of Inflation among ASEAN-5**

| Dependent Variables | Independent Variables | | | | | |
|---|---|---|---|---|---|---|
| | Post-Crisis Period | | | | | |
| | **ΔIndo** | **ΔMay** | **ΔPhil** | **ΔSing** | **ΔThai** | **ECT$_{t-1}$** |
| **ΔMay** | 0.4059 [0.6740] | - | 1.1087 [0.3573] | 2.2143 [0.1460] | 4.9239** [0.0240] | -0.1172*** (-4.3870) |
| **ΔIndo** | - | 1.7490 [0.2099] | 1.2682 [0.3118] | 0.0627 [0.9395] | 4.5789** [0.0295] | -0.0106** (-2.6288) |
| **ΔPhil** | 1.6878 [0.2205] | 3.1304* [0.0752] | - | 0.9139 [0.4236] | 3.7923** [0.0483] | -0.1203** (-2.6106) |
| **ΔSing** | 1.3916 [0.2810] | 0.6014 [0.5616] | 1.4421 [0.2695] | - | 3.5998* [0.0548] | -0.1107* (-1.9053) |

| | | | | | | |
|---|---|---|---|---|---|---|
| **ΔThai** | 3.1723* [0.0731] | 0.8999 [0.4289] | 0.6413 [0.5414] | 2.9748* [0.0838] | - | -0.1814** (-2.3822) |

*Notes*: ***, ** and * represent significance at the 1 per cent, 5 percent and 10 percent levels, respectively. ECT$_{t-1}$ is derived by normalizing the cointegrating vectors on the dependent variables, producing residual *r*. By imposing restriction on the coefficients of each variable and conducting *F*-statistics for each coefficient in all equations. Figures in the parentheses and squared parentheses represent *t*-statistics and probabilities for *F*-statistics, respectively.

## Conclusion and Policy Implications

The results of this study have shown that the crisis has a deep imprint on the degree of economic integration among the ASEAN-5 countries. The degree of co-movement in real output is shown to be weaker in the post-crisis period compared to the pre-crisis period. Due to the impact of the crisis, the ASEAN countries are pursuing various efforts at the domestic economy, focusing on re-building on their economic potentials to the pre-crisis level. The lesser degree of output integration at the regional level are also due to the fact that a few of the crisis-hit countries are pursuing macroeconomic recovery plan as suggested by the International Monetary Fund, while a few others were pursuing macroeconomic policy tailored made to the context of their domestic economic situations. Amid this dichotomy in the recovery strategy adopted by the ASEAN 5 countries, there is a lesser degree of economic synchronization within the region.

In the context of macroeconomic integration, the ASEAN-5 countries would have to expedite on the economic integration efforts so as to make up for the damages done by the 1997 crisis. Increased efforts towards achieving business cycle synchronization are needed through intensifying trade and investment among the ASEAN members would prove to be beneficial in achieving the AEC in 2020. Furthermore, macroeconomic policy harmonization in the spirit of the AEC could be cumbersome unless serious efforts are put in place to increase the degree of economic integration such as increased trade linkages, intra-ASEAN investment flow as well as greater degree of macroeconomic policy alignment. ASEAN needs to increase in efforts in all possible economic and social aspect in efforts to bring the ASEAN Vision 2020 into a reality.

On the other hand, there is evidence pointing towards higher degree of price integration among the ASEAN-5 countries in the post crisis period compared to the pre-crisis period. The increased price integration among the ASEAN-5 countries in the post-crisis period as indicated by the results of the study could facilitate the efforts towards a more coordinated monetary policy implementation across these countries. The greater degree of price integration among these countries not only provides a conducive environment for macroeconomic harmonization but also facilitate greater degree of economic integration to take place. Macroeconomic policy harmonization among these countries would be made possible if the governments through the central banks are committed to maintain a low and stable price environment in the region. The policymakers could take the price level in Malaysia as an indication of the price level environment for the ASEAN countries in general since the results of this study suggest that the Malaysian price level is reflective of the overall price level of the ASEAN-5 countries. Furthermore, since the study documents the increased sensitivity of the neighboring countries to the changes in the price levels in the Indonesian and Thai economies, coordinated efforts to contain inflation at the regional level will be beneficial for the ASEAN-5 in general.

There are several potential avenues for extension of this study. First, future research could focus on the economic integration among these countries in the post-crisis period by incorporating longer and more updated data after the 1997 crisis. The inclusion of more member nations in the study would definitely increase the credibility of the study. Second, it would be interesting to explore the impact of the 2007 US sub-prime crisis on the economic integration. Since the recent crisis originates from outside the region, it could have an emphasizing impact on the nature of integration of the ASEAN countries as well as how resilient the proposed level of economic cooperation through the AEC to global economic and financial shocks. This would further expedite the process of economic integration among the ASEAN members.

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