REGIONAL CONVERGENCE IN ASEAN-5 COUNTRIES: A TIME SERIES ANALYSIS

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ABSTRACT

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By

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Deepening in the Association of Southeast Asian Nations (ASEAN) integration process has enhanced the question of economic disparities at regional level. The objective of this study was to investigate the regional convergence in ASEAN-5 countries (Indonesia, Malaysia, the Philippines, Singapore and Thailand) in the year of 1970 to 2009. Empirical results from the unit root tests lend to support to the evidence of the stochastic convergence among the ASEAN-5 countries since 1970. The Johansen and Juselius cointegration tests provide the evidence that there was a cointegrating vector in Maximum Eigenvalue test and there were more than two cointegrating vectors in the Trace test. The persistence profile test showed that the ASEAN-5 countries needed to take around 10 to 12 years adjusting the long run equilibrium after the real shock of policies happened.
ABSTRAK

Daerah konvergensi di ASEAN-5 Negara: Time Series Analisis

Oleh
Ngu Nyok Ping

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CHAPTER 1
INTRODUCTION

1.0 Overview of Convergence

Convergence is one of the hottest topics among economists. Many researchers conducted studies on the regional convergence, both from a theoretical and analytical point of view by using the data from almost all the countries and regions in the world. Generally, convergence refers to the poor economy develops faster than rich economy. Poor economy has less capital therefore it has higher marginal productivity than richer economy. Thus, the growth rate of poorer economy is higher (Duncan & Fuentes, 2006). Convergence is often confined to the groups of geographically contiguous regions.

Convergence shows the long run tendency towards the equalization of per capita income or product levels (Rey & Montouri, 1998). Economic convergence refers to a process in which national economies display increasing similarities in the patterns of their performance (Habibullah et al., 2008). The idea of convergence is related to the idea that the poorest economy closes the gap with the richest economy in the dynamic transition to the steady state (Duncan & Fuentes, 2006). Convergence theory can be proposed into two definitions and it captures some of the implication of the neoclassical growth model for the permanence of contemporaneous output differences.
1.1 Measurement of Convergence

1.1.1 Convergence as Catching Up

Convergence as catching up considers the behavior of the output difference between two economies over a fixed time interval and equates convergence with the tendency of difference to narrow. According to the Equation 1.1, if $y_{i,t} > y_{j,t}$:

$$E(y_{i,t+T} - y_{j,t+T} | \Phi_t) < y_{i,t} - y_{j,t}.$$  \hspace{1cm} (1.1)

where, countries i and j converge between dates t and t+T if log per capita output disparity at t is expected to decrease in value (Duncan & Fuentes, 2006).

1.1.2 Convergence as Equality of Long-Term Forecasts at a Fixed Time

Convergence as equality of long term forecasts at a fixed time asks whether the long run forecasts of output differences tend to be zero as the forecasting horizon increases. Whereas, this definition is violated if history matters such as the effects of a shock on output differences persist into the indefinite future. The Equation 1.2 is as follows:

$$\lim_{k \to \infty} E(y_{i,t+k} - y_{j,t+k} | \Phi_t) = 0$$ \hspace{1cm} (1.2)

where, the countries i and j converge if the long term forecasts of log per capita output for both countries are equal at fixed time t. If this conditional expectation is
taken with respect to the linear space generated by current and lagged \( y_{i,t} - y_{j,t} \) rather than a general \( \Phi_t \), then this definition is equivalent to require that \( y_{i,t} - y_{j,t} \) is a linearly regular process. Besides that, this definition implies that convergence does not hold if \( y_{i,t} - y_{j,t} \) does not converge to a limiting stochastic process (Duncan & Fuentes, 2006).

1.1.3 Relationship between the Convergence Definitions

The relationship between the two definitions is quite straightforward. It is easy to show that the definitions can be ordered in terms of the range of restrictions placed on the behavior of output differences. Both of the definitions show that is very useful as they each represent implications of the neoclassical growth model, respectively (Duncan & Fuentes, 2006).

1.2 Neoclassical Growth Model

The neoclassical growth model, originated by Solow (1956), also known as Solow growth theory, has profoundly affected the way in which economists conceptualize long run interrelationships between macroeconomics. This model derived from the production function with diminishing marginal returns to capital properties and exogenous technical progress. Neoclassical growth theory predicts that per capita growth rates should be negatively correlated with initial levels of per
capita income, where poorer economies tend to grow faster than richer ones and then in long run they all grow at similar rates (Menbere, 1998).

Convergence is unconditional or absolute to common steady-state for all economies. The divergence is a transitory short term phenomenon reflecting adjustments towards a long run equilibrium level of per capita income (Bernard & Durlauf, 1996). Absolute convergence is said to pertain when all the economies converge regardless of economy specific factor which are economic policies, investment rate, composition of output and others. This means that the initial level is confirmed and occurred the similar economic and institutional characteristics when there have inverse relationship between the growths of per capita income. The higher speed of convergence is expected to be found when there are higher distances from the steady-state (Galor, 1996).

According to Solow (1956), the equation of the typical neoclassical stochastic growth model is show in Equation 1.3.

\[ Y_t = A_t F(K_{t-1}, H_{t-1}, L_{t-1}, \xi_t) \]  (1.3)

where, \( A_t \) denotes the level of productivity and can embody both deterministic and stochastic technical change

\( K_t \) and \( H_t \) denote physical and human capital, respectively

\( L_t \) denotes labour
is a productivity shock

Both physical and human capitals obey the laws of motion.

\[ K_t = (1 - \delta_K)K_{t-1} + s_k Y_t \]  \hspace{1cm} (1.4)

\[ H_t = (1 - \delta_H)H_{t-1} + s_H Y_t \]  \hspace{1cm} (1.5)

where, \( s_k \) and \( s_H \) denote saving rates

\( \delta_K \) and \( \delta_H \) denote depreciation rates

Labor grows at a constant rate of \( n \).

\[ L_t = (1 + n) L_0 \]  \hspace{1cm} (1.6)

Finally, some restrictions are placed on the function \( F (\cdot, \cdot, \cdot, \cdot) \). \( F (\cdot, \cdot, \cdot, \cdot) \) exhibits non-increasing return to scale and the function which is stated as follows:

\[ \frac{\partial F(0,H,L,\xi)}{\partial K} = \frac{\partial F(K,0,L,\xi)}{\partial H} = \infty \]  \hspace{1cm} (1.7)

and

\[ \frac{\partial F(0,H,L,\xi)}{\partial K} = \frac{\partial F(K,0,L,\xi)}{\partial H} = 0 \]  \hspace{1cm} (1.8)

Equations (1.1) – (1.6), it can be defined for any economy obeying the neoclassical growth model, \( \lim_{t \to \infty} \text{Prob}(A_t^{-1}L_t^{-1}Y_t|K_0,H_0,L_0) \) is independent of \( K_0, H_0, \) and \( L_0 \). The concavity of \( F (\cdot, \cdot, \cdot, \cdot) \) in the capital stocks means, for those
capital poor economies, they grow more sufficiently faster than those capital rich economies to offset differences in initial conditions. Romer’s (1986) model of capital complementarities is a case in point where the production function exhibits increasing returns, allowing output differences between economies to become unbounded (Bernard & Durlauf, 1996).

1.2.1 Relationship between the Neoclassical Growth Model and Convergence Definitions

Any pair of economies which fulfill the Equations (1.3) – (1.8) and possesses identical savings rates, population growth rates, production functions, and probability distributions of shocks, will exhibit convergence in the sense of both Definition 1 and Definition 2.
1.3 Regional Development in ASEAN-5 Countries

Since 1967, the Association of Southeast Asian Nations (ASEAN) was formed by five original member countries, which are Indonesia, Malaysia, the Philippines, Singapore, and Thailand with the signing of the Bangkok Declaration. The ASEAN formation was primarily driven by the political and security motivations in order to promote the cooperation in economic, social, technical, educational, cultural, and others (Denis & Soesastro, 2003). The main purpose is to promote the regional peace, stability, and security. The origins of the founding ASEAN countries initially came together for political and security reasons, at the same time desire to gain benefits from economic integration.
The ASEAN countries integration has resembled that the European Union (EU) more than the any other integrated group of economies. However, the inter-country within the five original ASEAN countries is far wider than each other compared to those within the EU-15. Nevertheless, the ASEAN-5 regions have held a good promise with each other as an alternative base for the manufacturing and services activities as well as domestic market potential.

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Table 1 shows the selected indicators for the ASEAN-5 countries in year 2009. ASEAN-5 countries differ considerably in size, level of economic development and resource endowments have undergone profound transformations (Lee & McAleer, 2003). From Table 1, Singapore is the smallest in terms of area and population among the ASEAN-5 countries. Nevertheless, Singapore has highest GDP per capita and no foreign debt. Indonesia is the largest country, however it has the lowest GDP per capita and the highest external debt.

The regional diversity within ASEAN-5 countries is considerable. However, the diversity in ASEAN-5 countries has created the synergies and opportunities which are yet to be fully realized. For example, the lower labor costs in Indonesia and the Philippines are more attractive compared to others. However, Malaysia and Thailand have comparative advantages in electronics and automobiles, Singapore has famous infrastructure and strong governance that make it becomes a natural regional hub and financial centre (John, 1995).

The ASEAN government had tried to come out several policies to develop the countries. ASEAN-5 economies are poised to achieve four to six percentage of GDP growth annually in the medium term. Since the Asian Financial Crisis in 1997 as well as global recession, most of the ASEAN countries economies were affected adversely. At that time, the association was weakened by the increasing internal division and also failure to deepen the ASEAN countries integration (Corsetti et al.,
1999). However, after the "post-financial crisis", the East Asian identity became stronger in their economic systems. The economic authorities within the region had concluded that the absence of financial cooperation in the financial markets and institutions had resulted insufficiently in managing the global capital flows. Thus, they were caused them unable to prevent the loss of the confidence that had stimulated on capital fight (Plummer, 2002).

The impacts of the financial crisis had stimulated the ASEAN government to had greater regionalism and it led the creation of the ASEAN plus Three (APT) grouping in 1999, which included Japan, South Korea and China (Hund, 2003). Hereby, the multilateral summits between the 13 South-East and North-East Asian countries had started convened on a regular basis in order to explore possibilities of preventing future financial crisis and enhance the regional cooperation. Moreover, ASEAN began to gain an important emphasis on the luring foreign capital inflows after the Asian Financial Crisis. It is because of the disproportionately high short-term financing of current account deficits instead of the long-term financing through foreign direct investment (Forster, 1999).

The significant steps for ASEAN countries towards deep cooperation through a policy-led process began with the ASEAN Free Trade Area (AFTA) in 1992. Followed by October 1998, the fifth ASEAN Summit of the Framework Agreement on the ASEAN Investment Area (AIA) was signed in order to attract more foreign
direct investment flows into the region through the various measures addressing from the investment facilitation and promotion (Akrasanee & Stifel, 1993). ASEAN regional cooperation moved forward to the trade in services, trade facilitation, investment cooperation, and intellectual property rights (IPRs). Others approaches were used in order to close the "development gap" through the integration for ASEAN initiative (Chiou, 2010). Indeed, the region in ASEAN was more integrated with its Asian neighbors and the world as a whole since the ASEAN economic cooperation in 2000. To date, ASEAN cooperation has extended to almost all areas of the economics as well as many social, cultural, and security areas (Nesadurai, 2003).
1.4 Problem Statement

Figure 2: Real GDP per capita in ASEAN-5 Countries from 1970 to 2009

Source: IMF, World Economic Outlook Database.

Figure 2 shows the real GDP per capita incomes of ASEAN-5 countries has huge gap between Singapore and others four ASEAN countries. It is because Singapore is the first ASEAN-5 country to achieve the newly industrialized countries (NIC) status, while the other four member countries are still in trailing economically. Since 1970, the real GDP per capita for Singapore was always the highest and it kept increasing since 1970 to 1997. However, although Malaysia has the second higher real GDP per capita among ASEAN-5 countries and the economic kept increasing since 1970 to 2009, the income gap is large compared to Singapore because Singapore’s economic growth was extremely fast since 1970. Besides that, Indonesia
has lowest real income per capita country. However, the income gap between Indonesia, the Philippines, and Thailand are quite small and they tend to catch up with each others.

Figure 2 shows that there are stark differences in economic and financial development between Singapore with Malaysia, the Philippines, Indonesia, and Thailand. Singapore is the world leader in a number of high-tech industries and the Philippines exports relatively low-tech manufactured goods. Moreover, Singapore is one of the most advanced financial markets in the world and is one of the leading foreign exchange trading centres. However the others are still in the early stage of developing and opening its financial markets. Hence, the level of diversity within ASEAN-5 countries is considerable.

Theoretically, the poorer countries with low initial income and productivity tend to grow more rapidly by copying the technology from the leader state. However, does it happen in ASEAN-5 countries which lead by Singapore? Is this phenomenon the same among regions within the countries in ASEAN-5? The large differentials in real GDP per capita across countries are regarded as an impediment to economic. The real income gap between ASEAN-5 countries showed the regional imbalances problems. It is reasonable for the ASEAN government to investigate that whether the ASEAN “poor” countries, those who have low per capita incomes – the Philippines and Indonesia, display faster growth rates in per capita income than those “rich”
countries – Singapore with higher per capita incomes. In this case, if the economy of poor countries grow faster than rich countries, it means the resulting in the former eventually catching up to the latter in per capita income level.

Countries economic disparities in ASEAN-5 hamper the economic growth. Since the early 1992, when the ASEAN established a framework to an ASEAN Free Trade Area (AFTA), it is found that ASEAN-5 countries exists economic disparity (Lee, 2005). However, does economic dispersion in real income within the five ASEAN countries tend to converge? If so, how fast do they converge? If not, how can we restore the countries balance? According to Abramovitz (1986), the economic growth has not led to catch up effects in the relatively poor regions as postulated by the new growth theories.

1.5 Objective of the Study

1.5.1 General Objective

The purpose of this study was to examine the regional convergence on the economic growth in the ASEAN-5 countries. Regional convergence and reduction of regional disparity is indeeded very important and deserved attention. Thus, the general objective of this study is to investigate the regional convergence in ASEAN-5 countries by using the time series analysis.
1.5.2 Specific Objectives

The specific objectives of this study were to:

i. Determine whether there exists a common deterministic or stochastic trend for different countries through the four types of unit root tests.

ii. Examine the degree of cointegration of ASEAN-5 economies in the long-run period.

iii. Ascertain the long-run impacts of a shock in ASEAN-5 economies to the co-integrated system.

1.6 Significance of the Study

This study aimed to analyze the convergence in ASEAN-5 countries by using the respective real gross domestic product per capita. This significance perception plays important parts to make sure the existence of market forces in ASEAN-5 will eventually lead to similar living standards across 5 countries in ASEAN-5. Regional convergence issues imply the substantial regional policy in order to take a necessary step to eliminate the disparity among Singapore, Malaysia, the Philippines, Thailand, and Indonesia.

The convergence study is of importance within the context of scholarly debates over the nature of the economic growth process. From economic growth process, the five ASEAN countries were help to evaluate the presence or absence of increasing