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The Role of Maastricht Criteria and Membership in Determining Convergence in the Eurozone and ASEAN: A Panel Data Analysis

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Abstract, *The effectiveness of The Maastricht Treaty (MT) to induce economic convergence in the area was questionable after some Eurozone countries hit by the recent economic crisis. Some studies showed that Maastricht Criteria (MC) as accession criteria for euro membership contributed to low growth in area. It is interesting to analyze the impact of MC and membership on income convergence in the Eurozone and compare it with Association of Southeast Asian Nation (ASEAN). Employing panel analysis, the purpose of this study is to comparatively analyze the income convergence with MC as control variables in the Eurozone and ASEAN during 1990-2009, or just one decade before and after the introduction of Euro coin. The result showed that both the Eurozone and ASEAN were unconditionally and conditionally converged, and also indicated the significance of MC in determining income convergence in both areas. The findings were interesting for policy makers, especially for ASEAN, which was in the process for implementing ASEAN Economic Community (AEC) by 2015.*

Keywords: Convergence; ASEAN; The Eurozone; Maastricht Criteria.

(JEL F33, F36, O11, O57)

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1. Introduction

Before creating a deeper integration, ASEAN may reflect from EU step and confirm a convergence condition in the area. This paper tries to comparatively analyze the income convergence in all members of the Association of Southeast Asian Nation (ASEAN) and the Eurozone[2] in 1990-2009 as two best examples of regional cooperation in the world. Convergence occurred unconditionally if countries are similar in every respect to other than their initial capital stocks, poorer countries will grow faster than wealthier ones and conditionally if we control for the determinant of the steady state (Ismail, 2008). To comparatively analyze the convergence condition of ASEAN and the Eurozone we apply a famous approach by Barro and Sala-i-Martin (1992) developing solow growth model using β convergence term.

Regarding integration progress, ASEAN is by large far behind Euro (EU). While EU has been implementing the European Monetary Union (EMU), ASEAN is still in the process to fully implement the ASEAN Free Trade Area (AFTA). Both regional institutions face the membership enlargement as the same challenge. Established in 1957 by six original members (Belgium, Germany, France, Italy, Luxembourg, and Netherlands) signing the Rome treaty, the 27-membered EU almost achieved a fully economic integration since January 1, 2007 (Schuller and Lidbom, 2009). ASEAN, established in 1967 with five non-communist Southeast Asian countries aimed at managing regional peace, has 10-members since 1999.

EU is one of the most remarkably successful examples of regional integration. EU in Nice (December 2000) has paved the way for the enlargement. This act is the last of a series of steps towards the enlargement. At the European Council summit in Copenhagen (June 1993), the Union invited the Central and Eastern European countries (CEEC) to enter the EU with guarantying democracy, market economy, and *fulfilling membership obligation* as three accession criteria[3]. ASEAN prepared Indo-Chinese Countries to be members through Treaty of Amity and Cooperation in Southeast Asia in 1976. Although Vietnam, dominating others, refused the invitation, the resolution of Cambodia Crisis paved the way for reconciliation between ASEAN and Indo-Chinese countries. Finally, the Singapore declaration in 1992 allowed all Southeast Asian Countries to be members of ASEAN (Angresano, 2003).

European and Southeast Asia integration should push the area toward fewer differences either in nominal or real economic condition. Both EU and ASEAN maintained the policy to narrow down the development gap between member countries in enhancing the solidarity, togetherness and to avoid further conflict between members. In order to deepen the level of integration, EU implemented the Treaty of Maastricht (MT) in 1991. MT contains five criteria for creating a monetary union (De Grauwe, 2005)[4]. The criteria were intended as accession requirements for joining "the Eurozone". Started with 11 initial members, today EMU has seventeen members today[5]; however, deep economic crisis since last 2007 and slow growth in the Eurozone showed that MC has been reluctant to absorb several shocks resulted from global crisis, especially the ones aimed at cuing a crisis in the part of the area**.** Benassy-Quere and Boone (2010) indicated that serious crisis was a result of lack of enforcement to obey MC and misguided surveillance. Comparing income convergence of ASEAN with EMU by using MC as control variables will give a lesson for ASEAN to estimate whether ASEAN will continue further or not to create a monetary integration based on EMU lesson.

Many scholars, using various methods – most commonly panel analysis, investigated income convergence either in EU or ASEAN. The studies of Kaitila (2005), Vojinovic and Prochniak (2009), Chowdhury (2005), Ismail (2008), and Haider, Hamid, and Wajid (2010) mostly found that both EU and ASEAN were converged conditionally, but they had a different result for unconditional convergence. The impact of MC toward income convergence and growth in EU was investigated by some scholars, such as Soukiazis and Castro (2005) who showed that MC had a significant impact on growth. Inflation and public debt have negative impact. In line with these scholars, Azali et al (2007) showed a long-run relationship between variables in the MC with growth in ASEAN.

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[2] The Eurozone refers to an area of several countries using Euro as a common currency..

[3] http://ec.europa.eu/enlargement/enlargement_process/accession_process/criteria/index_en.htm

[4] The Criteria are:

- Inflation rate is not more than 1.5% higher than the average of the three lowest inflation rates of EU members;
- Long-term interest rate is not more than 2% higher than the average observed in these three low-inflation countries;
- Has joined the exchange rate mechanism of the EMS and has not experience devaluation during the two years preceding the entrance into the union;
- Government budget deficit is not higher than 3% of its GDP (if it is, it should be declining close to the 3%)
- Government debt should not exceed 60% of GDP (if it is, it should diminish approach the referenced value.

[5] The newest member is Estonia which adopted Euro in January 2011. Estonia was not included in this study since the period of study was 1990-2009.

This study was focusing on MC and membership role in determining the income per capita convergence: how current unconditional and conditional convergences in Eurozone and ASEAN are, whether MC can influence income convergence in both areas or not, how the impact of membership toward convergence and lessons that can be learned by ASEAN from Eurozone's experience.

The study expected to contribute to the literature in the following ways: the study break ground for comparing the income convergence augmented by Maastricht variables and membership in developed regional integration (the Eurozone) with developing regional integration (ASEAN) involving all member countries; the result empirically tests the relevant theories, and the empirical result tests the possibility to apply a deeper integration in ASEAN based on the short run of Eurozone's experiences with MC and the Euro.

This study found that both the Eurozone and ASEAN countries converged either unconditionally or conditionally. Almost all MC variables had significant impacts on convergence in both areas, except exchange rate variable in ASEAN. Membership role had different results, which was positive for ASEAN and negative for countries joining the euro. Reason for negative result in the Eurozone most likely was the limited authority of member countries in determining fiscal and monetary policy to fix worst condition in each country, which restrain growth; however the definite answer was waiting for a medium run economic performance.

2. Descriptive Analysis

2.1 The Eurozone

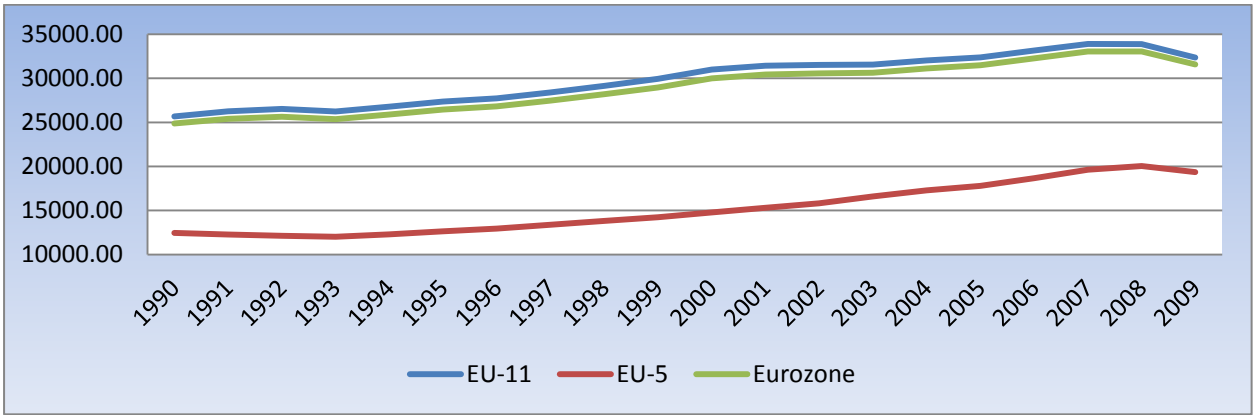
Since launched on January 1, 1999 as the third stage of Economic and Monetary Union, the Eurozone now has 17 member countries. The economic convergence required an important factor of macroeconomic stabilization for members as well as for the countries planning to join the Eurozone. Among original Eurozone countries, Luxembourg was the wealthiest country for its per capita income from 1990 until 2009, and Portugal was at the lowest level. However, if we compared it with new Eurozone members, Slovakia (former was Czechoslovakia) was the lowest one. Per capita income of Luxembourg in 1990-1994 was almost four times of Portugal and more than ten times of Slovakia. The gap with Slovakia was narrower in 2005-2009 than previous periods since per capita income of Luxembourg was eight times of Slovakia; however, the gap with Portugal in the last period was higher since it was almost five times.

Table 1: Average Real Per Capita GDP in the Eurozone Countries

Country	1990-1994	1995-1999	2000-2004	2005-2009
Austria	29286.09	31943.21	35382.70	38407.69
Belgium	28700.66	31352.22	34715.95	37116.41
Finland	26063.29	29052.05	34587.41	39053.88
France	28091.05	29919.09	33058.21	34696.29
Germany	28904.45	30869.01	33296.08	35145.54
Ireland	23269.60	32025.19	43782.32	48538.77
Italy	25903.24	27893.97	30108.21	30278.80
Luxemburg	54570.01	61086.52	74800.97	85540.09
Netherland	30090.45	33889.39	37994.05	40770.37
Portugal	14223.05	16080.17	18080.22	18351.48
Spain	19201.83	21297.28	24828.12	26959.89
Cyprus	16456.25	19024.56	21590.67	23494.18
Greece	15623.98	16506.37	19711.56	23174.34
Malta	10354.81	12798.77	14346.25	15540.06
Slovakia	5426.21	6557.71	7624.95	10228.77
Slovenia	11735.20	13265.08	16012.52	19352.15

Source: calculated from Unstats, National Account Main Aggregate Database, available at http://unstats.un.org/unsd/snaama/dnlList.asp

The Eurozone experienced highest growth rate in the period 1994-1999 or before creating Euro coin with 3.48% growth rate; however, in the last period 2004-2009, the growth rate was only 1.11% mainly because of starting crisis suffered by the Eurozone in 2007. Dividing into Eurozone-11 and Eurozone-5, Eurozone-5 experienced higher growth rate almost in all periods except in 1990-1994. The gap between the original Eurozone countries with the new entrants was constant. The Eurozone-11 per capita income increased around US$ 25,000 until US$ 35,000, while the new members' per capita income increased around US$ 10,000 until US$ 20,000. Figure 1 showed that the trend between the two groups was not much different.



Source: created from Unstats, National Account Main Aggregate Database, available at http://unstats.un.org/unsd/snaama/dnlList.asp

Fig. 1. Real Per Capita GDP of Eurozone Countries

Looking at HDI in table 2, Ireland had the highest rank; Portugal was the lowest although it was an old Eurozone member. Greece was the highest among new members, or in the 8th position. Germany had longest mean years school and Slovenia was the shortest; France had longest life expectancy and Slovakia was the lowest. Overall, no significant gap between original and new members since all members were categorized as high HDI countries.

Tabel 2: Human Development Index of Eurozone Countries in 2010

World-Rank	Country	HDI	Life Expectacy	Mean Years School	GNI Percapita
5	Ireland	0.895	80.3	11.6	33,078
7	Netherlands	0.890	80.3	11.2	40,658
10	Germany	0.885	80.2	12.2	35,308
14	France	0.872	81.6	10.4	34,341
16	Finland	0.871	80.1	10.3	33,872
18	Belgium	0,867	80.3	10,6	34,873
20	Spain	0.863	81.3	10,4	29,661
22	Greece	0.855	79.7	10.5	27,580
23	Italy	0.854	80.4	9.8	29,619
24	Luxembourg	0.852	79.9	10.1	51,109
25	Austria	0.851	80.4	9.8	37,056
29	Slovenia	0.828	78.8	9	25,857
31	Slovakia	0.818	75.1	11.6	21,658
33	Malta	0.815	77.7	9.9	21,004
35	Cyprus	0.810	80	9.9	21,962
40	Portugal	0.795	79.1	8	22,105

Source: Human Development Report 2010, UNDP, available at http://hdr.undp.org/en/statistics/data/

2.2. ASEAN

The enlargement of ASEAN faces a challenge to the ASEAN Economic project. Economically, ASEAN members were hugely different and only Singapore, Brunei and Malaysia were not included as "Third World". Nevertheless, Cambodia, Lao PDR, Myanmar, and Vietnam (CLMV) enlargements gave more challenges. ASEAN proposed a deepening and widening of regional cooperation. ASEAN concord II in 2003 made turning point, which main goal was forming a single market. ASEAN played key roles for regional economic cooperation and Free Trade Area (FTA). In 2010, AFTA started to be realized in ASEAN-6 by removing 99.65% of all tariffs under the common effective preferential tariff (CEPT) scheme.

There was a significant income disparity between ASEAN member countries. The gap was not only between old and new entrants but also within old members or ASEAN-6. In 1990-2009, Singapore and Brunei had per capita income more than US$25,000 and included as high income country. Malaysia, Thailand, Indonesia and the Philippine could be categorized as upper middle income countries since their per capita income were between US$1,000-US$5,000. In 1970-1979, Brunei has the highest per capita income US$ 37,623 or 90 times of Indonesia as the lowest in ASEAN-6 and 506 times of Myanmar as the lowest in ASEAN-10. In 2000-2009 Singapore took over Brunei as the richest in ASEAN as its per capita income was US$ 27,509 or 24 times of the Philippines as the lowest in ASEAN-6

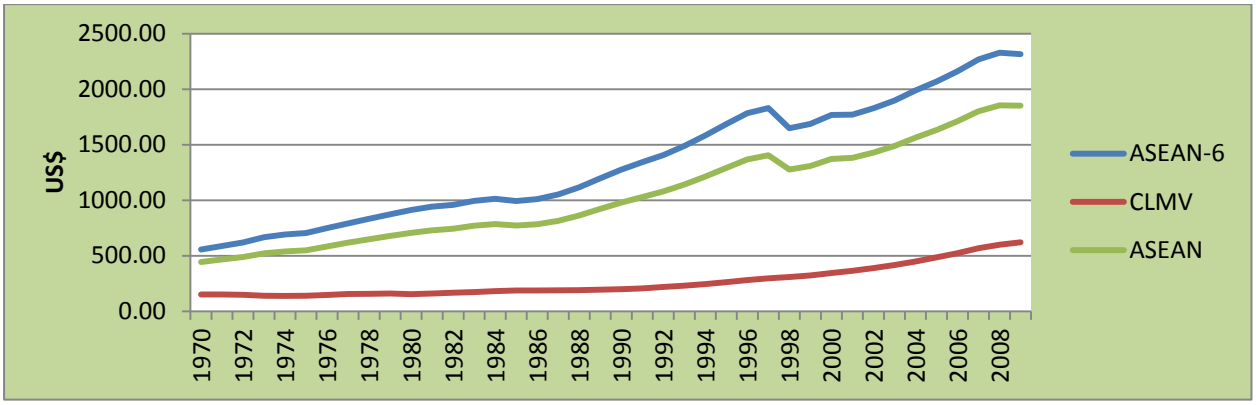
and 115 times of Myanmar as the lowest in ASEAN-10. The gap between members decreased, but it remained huge and existing.

Table 3: Average Real Per Capita GDP in ASEAN Countries

Country	Period			
	1970-1979	1980-1989	1990-1999	1990-2009
Indonesia	416.85	657.75	1050.51	1298.79
Malaysia	1699.38	2541.20	3946.08	5290.29
Philippine	883.16	951.48	941.77	1144.15
Singapore	6713.42	11710.97	19494.62	27509.13
Thailand	696.36	1071.94	2008.40	2599.79
Brunei	37623.81	33802.47	26679.79	25808.46
Cambodia	268.35	188.77	248.18	437.04
Lao PDR	174.26	228.47	305.38	481.54
Myanmar	74.36	89.40	97.30	239.42
Vietnam	176.15	230.85	352.98	619.36

Source: calculated from Unstats, National Account Main Aggregate Database, available at http://unstats.un.org/unsd/snaama/dnlList.asp

ASEAN experienced the highest growth rate in 2000-2009 with 4.27% growth rate. In this period, CLMV That developed after the war has the highest growth rate (7.30%) in contrast with the period 1971-1980 that experienced negative growth (-0.33%). ASEAN-6 has the highest growth rate in 1971-1980 with 5.43% growth rate. Although the dispersion was lesser than the initial period, the gap between ASEAN-6 and CLMV is still large. CLMV countries were categorized as low-income countries for their per capita income were under US$1,000; while, most ASEAN-6 countries were considered as middle income countries. Figure 2 described the dispersion especially in current condition.



Source: created from Unstats, National Account Main Aggregate Database, available at http://unstats.un.org/unsd/snaama/dnlList.asp

Fig. 2. Real GDP Per Capita of ASEAN Countries

The gap was not only in per capita GDP but also in the Human Development Index (HDI). Based on UNDP criterion, table 2 showed that Singapore and Brunei were included as HDI countries; Malaysia was an upper medium HDI country; while Thailand, the Philippine, and Indonesia were categorized as lower medium HDI countries; and CLMV were low HDI countries.

Table 4: Human Development Index of ASEAN Countries in 2010

World-Rank	Country	HDI	Life Expectancy	Mean Years Schooling	GNI Percapita
27	Singapore	0.846	80.7	8.8	48,893
37	Brunei	0.805	77.4	14	49,915
57	Malaysia	0.744	74.7	9.5	13,927
92	Thailand	0.654	69.3	6.6	8,001
97	Philippines	0.638	72.3	8.7	4,002
108	Indonesia	0.600	71.5	5.7	3,957

113	Viet Nam	0.572	74.9	5.5	2,995
122	Lao PDR	0.497	65.9	4.6	2,321
124	Cambodia	0.494	62.2	5.8	1,868
132	Myanmar	0.451	62.7	4	1,596

Source: Human Development Report 2010, UNDP, available at http://hdr.undp.org/en/statistics/data/

Singapore had highest life expectancy indicator or 80.7 year and Cambodia was the lowest. Life expectancy was the proxy for overall health of the people. Brunei had longest mean years schooling while Myanmar was the shortest. The same thing happens in the context of GNI per capita. The data clearly indicated the gap between old and new members of ASEAN.

3. Data and Model Specification

This study tried to find β convergence in real per capita GDP growth among the Eurozone members[6] and ASEAN countries[7]. MC variables were represented by inflation rate (the proxy was measured by a percentage of consumer price index or CPI), interest rate (the proxy was the percentage of long term deposit interest rate), exchange rate (the proxy was local currency per US Dollar variability), budget deficit (a percentage of GDP, and mostly had negative value) and public debt (a percentage of GDP).

The data for per capita GDP, exchange rate are from National Accounts Main Aggregate Database (Unstat), inflation rate from World Economic Outlook (WEO) published by IMF, interest rate from World Development Indicator (WDI) published by World Bank and ASEAN Secretary, and for deficit ratio and public debt ratio are from WEO and Organization for Economic and Development Statistics (OECD.stat).

The analysis of convergence was based on Neo-Classic growth theory framework developed mainly by Solow (1956) and Barro and Sala-i-Martin (1992). Starting with general Cobb-Douglas Production function model:

$$(1) Y_{i,t} = K_{i,t}^{\alpha}(A_{i,t}L_{i,t})^{1-\alpha}$$

Where Y_{it} was the total amount of production of the final good at time t in country i, $K_{i,t}$ was the capital stock at time t in country i, $A_{i,t}$ was technology at time t in country i, and Li,t was total employment in country i at time t. Defining $k_{i,t}= K_{i,t}/ A_{i,t} L_{i,t}$ as the stock of physical capital per unit of effective labor, and $y_{i,t}=Y_{i,t}/ A_{i,t} L_{i,t}$ as output per unit of effective labor in country i at time time the we derived the differential equation:

$$(2) \frac{dk_{i,t}}{d_t} = s_i y_{it} - (g + n + \delta)k_{it}$$

When g was technological progress of A, n was the growth rate of the labor force and δ was the depreciation of K. The production function in the intensive form could be written as $y_{i,t}=k^{\alpha}_{i,t}$. Then the intensive form of steady state of capital was:

$$(3) \ln k_i^* = \frac{1}{1-\alpha}\ln s_i - \frac{1}{1-\alpha}\ln(g_i + n_i + \delta)$$

Substituting the steady state k* we obtained

$$(4) \ln y_i^* = \ln(A_{i,o}) + g_{i,t} + \frac{\alpha}{1-\alpha}\ln s_i - \frac{\alpha}{1-\alpha}\ln(g_i + n_i + \delta)$$

Following Barro and Martin (1992) for unconditional convergent equation would be:

$$(5) \ln y_{i,t} - \ln y_{i,t-1} = \alpha + \beta \ln y_{i,t-1} + v_{i,t}$$

Since determinants of economic growth differ across countries, Barro (1991) and Barro and Sala-i-Martin (1992) favor the notion of conditional convergence:

$$(6) \ln y_{i,t} - \ln y_{i,t-1} = \alpha + \beta \ln y_{i,t-1} + \gamma X_{i,t} + v_{i,t}$$

Where t indicates the of the time interval, (t-1) is the initial of the time interval ε is the stochastic error term, and y is real GDP per people. Unconditional convergence could be defined if income convergence occurred for the whole group without conditioning on specific characteristics of the countries but if it occurred only among a subgroup of the

[6] Austria, Belgium, Cyprus, Finland, France, Germany, Greece, Italy, Ireland, Luxembourg, Malta, Netherland, Portugal, Spain, Slovakia, and Slovenia.

[7] Indonesia, Malaysia, Philippine, Singapore, Thailand, Brunei, Cambodia, Lao PDR, Myanmar, and Vietnam.

countries that in advance share the same structural characteristics than it was conditional convergence (Vojinovic and Prochniak, 2009).

Following the way of Azali et al (2007) and reconstructing the model of Soukiazis and Castro (2005) for empirical analysis, I constructed equation (6) by augmenting a set of control variables (Maastricht Variables) and dummy variable 1 using Euro as a currency and 0 before it (for the Eurozone case); 0 before joining ASEAN and 1 afterward (for the ASEAN case) and additional dummy variable for Asian crisis 98 for ASEAN. Thus, it expects to determine the steady-state growth of per capita GDP. Therefore, the full empirical testing is as the following:

(7) $\ln y_{it} - \ln y_{i,t-1} = \alpha + \beta \ln y_{i,t-1} + \gamma_1 \text{inflation}_{i,t} + \gamma_2 \text{interest rate}_{i,t} + \gamma_3 \ln \text{exchange rate}_{i,t} + \gamma_4 \text{deficit}_{i,t} + \gamma_5 \text{public debt}_{i,t} + \gamma_6 \text{Dummy}_{i,t} + v_t$

To capture the level of convergence using β convergence term, I considered a typical Barro growth regression:

$$\Delta y_t = \beta \ln y_{t-1}$$

or

$$\ln y_t - \ln y_{t-1} = \beta \ln y_{t-1}$$

$$\ln y_t = \ln y_{t-1} + \beta \ln y_{t-1}$$

$$\ln y_t = (1+\beta) \ln y_{t-1}$$

The equation suggest that If $\beta>0$ then p_t will explode; If $\beta<-1$ then p_t also will explode; β convergence is hold when the coefficient of the initial dependent variable is negative between 0 and -1. The closer to -1 point, the higher was the speed of adjustment into the same steady state. In term of equation (7) a significant negative β higher than -1 implies convergence holds conditionally when $\gamma \neq 0$.

4. Results

4.1 The Eurozone

Unconditional β convergence was given by equation (5) and conditional β convergence followed equation (7). The Eurozone converged during the period of study since the result showed negative significance although the speed was slow. For unconditional, the speed is 0.08% with adjustment time and the highest speed existed when the equation was augmented by MC variables minus public debt variable with the speed of convergence 0.22%.

Table 5: Real Per Capita GDP Convergence and The Importance of MC and Membership in the Eurozone: Panel Data Regression, 1991-2009

Specification	1	2	3	4	5	6	7
Basic Explanatory Variable							
Constant	0.0098*	0.0057	0.0131*	0.0154*	0.0126*	0.0267*	0.0224*
ln GDP per People (-1)	-0.0008*	-0.0003	-0.0010*	-0.0013*	-0.0009*	-0.0022*	-0.0018*
Dummy Membership		-0.0010*	-0.0010*	-0.0009*	-0.0012*	-0.0016*	-0.0018*
Maastricht Variables							
Inflation			-5.94E-05*	-2.86E-05***	-1.59E-05	-3.75E-05*	0.0003*
Interest Rate				-1.69E-05*	-6.97E-06	-1.13E-05**	-0.0003*
ln Exchange Rate					0.0039*	0.0023*	0.0019**
Deficit						0.0005*	0.0005*
Public Debt							9.45E-06**
Weighted Statistics							
R-Squared	0.0170	0.0341	0.1287	0.1813	0.2287	0.4610	0.4776
Adjusted R-Squared	0.0138	0.0277	0.1200	0.1703	0.2157	0.4500	0.4647
F-Statistic	5.2245	5.3097	14.7211	16.4406	17.5567	42.0436	36.8361
Prob. (F-Statistic)	0.0230	0.0054	0.0000	0.0000	0.0000	0.0000	0.0000
Observations	304	304	303	302	302	302	290

*Note: *Significance in 1%, ** in 5%, and *** in 10%*

In fully augmented by MC variables model (column 7), all variables were significant. Inflation had positive influence although in other models the result was negative. As expected, interest rate had negative impact showing the higher the interest rate the lower the growth will be; exchange rate had positive impact indicating the appreciation

decreases growth; the debt had positive influence describing the higher government deficit the bigger negative impact on growth; and the debt had positive impact toward growth meaning the higher the debt the higher the growth rate; however, joining Euro has negative impact on growth.

Comparing old and new members of the Eurozone, it indicated that new members (0.4%) have four times higher speed than the old ones (0.1%). Table 6 showed that public debt was insignificant variable for the Eurozone-11 and exchange rate was insignificant variable for new Eurozone countries (Eurozone-5).

Table 6: Real Per Capita GDP Convergence and The Importance of MC and Membership in the Eurozone-11 and 5: Panel Data Regression, 1991-2009

Specification	Eurozone-11	Eurozone-5
Basic Explanatory Variables		
Constant	0.0148*	0.0461*
ln GDP per People (-1)	-0.0010**	-0.0044*
Dummy Membership	-0.0018*	-0.0022*
Maastricht Variables		
Inflation	0.0005*	0.0002**
Interest Rate	-0.0005*	-0.0003*
ln Exchange Rate	0.0019***	-5.06E-05
Deficit	0.0004*	0.0005*
Public Debt	6.36E-06	4.42E-05*
Weighted Statistics		
R-Squared	0.4651	0.5204
Adjusted R-Squared	0.4492	0.4744
F-Statistic	25.3027	11.3147
Prob. (F-Statistic)	0.0000	0.0000
Observations	209	81

*Note: *Significance in 1%, ** in 5%, and *** in 10%*

The reason for the slow convergence in the Eurozone could be explain as the result of low growth in the countries of Eurozone. Irvin (2005) stressed that 1990s growth was constrained as countries tightened their budget to meet MC as condition for joining Eurozone, low investment had slowed economic activity, and some biggest countries as Germany might join Japan in deflation league. Furthermore, Bukowski (2008) stated that slow speed of convergence could be referred to over regulating of economies, rigid wages and prices, excessively developed social policy, high taxation burden for population and enterprises, and too big budget should be reduced while reducing taxes and expenditures at the same time. Hein (2009) noted that an incomplete synchronization of the business cycle across the Eurozone and the fact that ECB displays different long-run trend rates of growth and inflation.

Klaus (2010) considered that economic growth of its member states slowed down compared to the previous decades from 3.4 in 1970s, 2.4 in 1980s, 2.2 in 1990 and 1.1 from 2001 to 2009. He indicated that the slow speed of convergence resulted from separate inflation group of countries in the area: the low and high (Greece, Spin, Portugal, Ireland and some other countries). Straightly speaking, the slow speed of convergence was probably caused by recession during early 1990s in some transition economies, lack of well synchronized market systems among them, the lack of EU policy in reducing income disparity at the beginning of 1990s and imported mortgage house crises from USA since last 2007s.

The phenomenon of positive effect of inflation on growth in the Eurozone that could be resulted from a primary goal of ECB is price stability or inflation targeting, with target should be below 2% (Breus (2009)**.** This view was also supported by Bokowski (2009), mentioning that no reasons to claim that maintaining inflation at low level (1-2.5%) was a factor holding up economic growth. Adverse effect was that sustainable high unemployment rate unlikely to be a result of low inflation rate.

Hein (2009) stressed that the monetary policies of ECB, primarily committed to pursue low inflation caused a pronounced anti growth bias and had considerable asymmetric effects across area since structural characteristics of EMU didn't meet the conditional of OCA. Irvin (2005) investigated that low levels of demand, decreasing oil prices and the strong Euro reduced the pressure on inflation. Different inflation levels among member states made it

necessary to rethink inflation target to avoid the danger of deflation at the lower end of the scale. If deflation happens, monetary policy will lose most of its instrument, therefore everything has to be done in order to avoid it from the start.

Joining Euro had negative impact on economic growth in the area. It could be that the joining cost was higher than benefiting from disappearance of the costs of currency exchange, related risk in economic relationship, price and employment stabilization and growth of real GDP. Delivering monetary policy to ECB and hold tighten fiscal policy made every member faced difficulty in fixing worst condition in their own countries since the weaknesses of fiscal policy were that government doesn't have enough information concerning the course of economic growth, difficulty in achieving a parliamentary consensus concerning changes in the size of the budget deficit and budget structure, a long period of preparing and discussing tax changes, social barriers in raising taxes or limiting budget expenditures, specificity of government expenditure, it is easier to raise them but more difficult to reduce them and political cycle being in contradiction to rational fiscal policy (Slowomir, 2009).

The main weakness of fiscal policy was that the fiscal federalism doesn't allow tackling regional and structural asymmetries. The policy also was responsible for slow growth, high unemployment and unsatisfactory real convergence in 1990s. Since fiscal federalism was insufficient and national fiscal policies were restrained by the stability and growth pact (SGP)[8], there were fiscal policy instruments neither to counteract regional and structural asymmetries nor to stabilize the area in severe recession. The magnitude of dummy membership variable was not different with the study of Papaioannou (2010) which concluded that sticking with SGP has negative impact toward growth.

4.2 ASEAN

Table 7 showed that ASEAN converged during period of study as the result showed negatively significance although the speed, as the Eurozone, was slow. For unconditional the speed was 0.19% and the highest speed existed when the equation was augmented by MC variables minus public debt variable with the speed of convergence was 0.29%.

Table 7: Real Per Capita GDP Convergence and The Importance of MC and Membership in the ASEAN: Panel Data Regression, 1990-2009

Specification	1	2	3	4	5	6	7
Basic Explanatory Variable							
Constant	0.0196*	0.0195*	0.0207*	0.0240*	0.0240*	0.0257*	0.0232*
ln GDP per People (-1)	-0.0019*	-0.0023*	-0.0024*	-0.0026*	-0.0026*	-0.0028*	-0.0028*
Dummy Membership		0.0044*	0.0039*	0.0036*	0.0036*	0.0034*	0.0047*
Dummy Crisis 98		-0.0107*	-0.0102*	-0.0094*	-0.0094*	-0.0088*	-0.0087*
Maastricht Variables							
Inflation			-2.40E-05	-8.28E-06	-8.27E-06	-1.01E-05	-2.11E-05
Interest Rate				-0.0002*	-0.0002*	-0.0002*	-0.0003*
ln Exchange Rate					2.37E-06	2.09E-05	-5.96E-06
Deficit						0.0001**	0.0001**
Public Debt							2.44E-05*
Wiehted Statistics							
R-Squared	0.2515	0.4118	0.4170	0.4438	0.4438	0.4625	0.4827
Adjusted R-Squared	0.2477	0.4028	0.4051	0.4294	0.4265	0.4429	0.4610
F-Statistic	66.5321	45.7441	34.8720	30.9546	25.6627	23.6015	22.2765
Prob. (F-Statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Observations	200	200	200	200	200	200	200

*Note: *Significance in 1%, ** in 5%, and *** in 10%*

In the full model (column 7), among all variables, inflation and exchange rate variables were not significant. As been expected, interest rate had negative impact showing the higher the interest rate the lower the growth would be; government deficit had positive influence describing higher government deficit would harm for growth; the debt had positive impact on growth meaning the higher debt would increase the growth rate; becoming ASEAN member had positive impact on growth; and Asian crisis in 1998 had negative influence on growth.

Table 8: Real Per Capita GDP Convergence and The Importance of MC and Membership in the ASEAN-6 and CLMV: Panel Data Regression, 1990-2009

[8] An agreement between the eurozone countries to ensure the stability in EMU by stressing the implementation MC in the eurozone (http://ec.europa.eu/economy_finance/sgp/index_en.htm)

Specification	ASEAN-6	CLMV
Basic Explanatory Variables		
Constant	0.0132*	-0.0463*
ln GDP per People (-1)	-0.0012**	-0.0083*
Dummy Membership		0.0066*
Dummy Crisis 98	-0.0107*	-0.0074**
Maastricht Variables		
Inflation	-0.0002*	-3.37E-05
Interest Rate	1.58E-05	2.97E-05
ln Exchange Rate	0.0001	0.0011
Deficit	6.66E-05	0.0004***
Public Debt	1.92E-05	6.50E-06
Weighted Statistics		
R-Squared	0.4969	0.3835
Adjusted R-Squared	0.4654	0.3141
F-Statistic	15.7997	5.5218
Prob. (F-Statistic)	0.0000	0.0000
Observations	120	80

*Note: *Significance in 1%, ** in 5%, and *** in 10%*

Comparing original members and CLMV, the result indicated that CLMV countries (0.81%) had six times higher convergent speed than the older members (0.12%). The result also showed that interest rate, exchange rate and public debt were insignificant variables either in ASEAN-6 or CLMV. For MC as controller variables, interest rate had negative influence on growth. The sign of interest rate was as we expected since high interest rate would reduce the capital investment and the growth. The negative sign of inflation on income convergence was relevant with Barro (1997)'s finding. It's indicating that the effect of inflation was significantly negative on growth in high inflation countries although the impact was low. The depreciation of exchange rate would increase the export and the growth; however, the result showed a different sign and not significant. Membership had a role in influencing positive growth since the sign was positive and significant. The positive sign of deficit can be defined as the reduction of deficit would be beneficial for convergence process. The result was in line with study of Soukiazis and Castro (2005).

The debt had positive impact on growth as it was one of physical capital sources determining growth. Debt as the tools of fiscal policies used to stimulate economic growth in the short term; however, too high debt could cause adverse effect toward growth. Basically, a high deficit or debt implies higher future taxes or lower future government spending if the government was expected to repay its debt (Carment and Rogoff, 2010). Following table showed average deficit and debt in ASEAN countries

Table 9 ASEAN Countries Average Deficit and Debt: 1998-2009

Countries	Deficit	Debt
Indonesia	-0.96	53.77
Malaysia	-3.31	42.67
Philippine	-3.43	58.98
Singapore	5.64	91.86
Thailand	-1.79	48.93
Brunei	6.11	6.80
Cambodia	-1.64	35.33
Lao PDR	-4.72	107.48
Myanmar	-2.05	85.84
Vietnam	-3.22	47.33
Total	**-0.94**	**57.90**

Source: Author's Calculation based on IMF, World Economic Outlook 2010.

Overall, based on table 9, on average debt ratio of ASEAN was 57.9%, which was in line with the finding of Carment and Rogoff (2010) and regression result showing that the relation between government debt and real GDP growth was weak for debt/GDP ratios below a threshold of 90% of GDP. Above it, median growth rate felt by one percent. Another side, emerging United States and some advance countries after The World War II were resulted from high growth spurred by high debt.

The speed of convergence (0.19% for unconditional convergence, and 0.28% by augmenting Maastricht Variables) was slow. Analytically, there were two broad methodological views that could explain the convergence

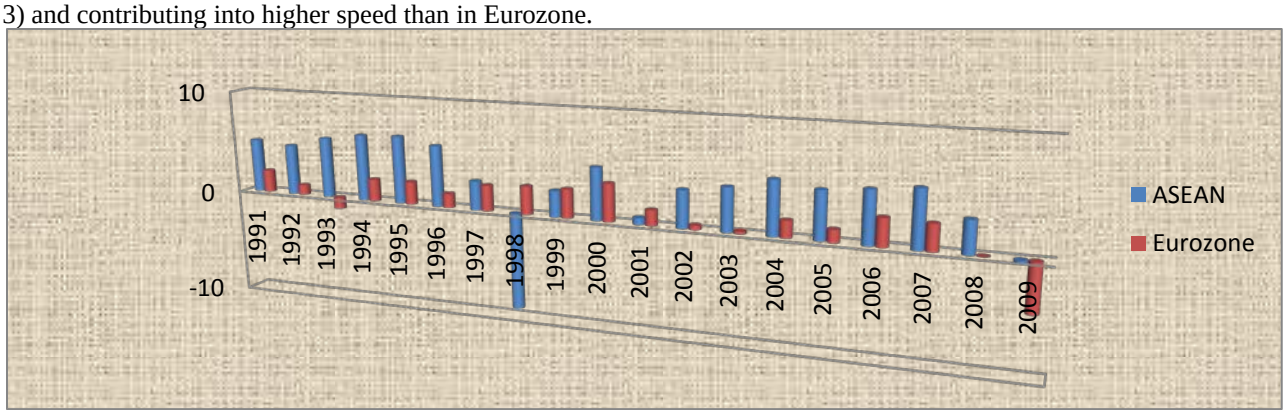
process. The first being the technological "catching up" hypothesis where technical know-how spread from the technologically advanced countries to the technologically backward countries causing convergence in per capita output levels. Openness in trade was thought to be the driving force in accelerating the adoption and diffusion of appropriate technology across countries. This view was dominant in the writings of the classical economists.

The second view was derived from the transitional dynamics of the neoclassical growth models. These predict that if countries had different capital-labor ratios, their growth paths would eventually converge to a steady-state growth path because of diminishing returns to capital. Even in an extended Solow Model such Mankiw et al, convergence depended on the simplifying assumption that market were perfectly competitive, technical change was exogenous and the level of technology is the same though out. Any failure of convergence could be attributed to the breakdown of these assumptions (Chuwdhury, 2005).

As implied by Barro (1997), the slow convergence indicated that the rich countries had higher steady state value of k (capital), the poor countries would have no possibility of convergence in an absolute sense; conditionally each country would have a tendency to more rapid growth which would push bigger gap between its initial level of income per capita and its own long run steady state per capita income. The convergence, either conditionally or unconditionally in ASEAN-10, would still have to go through a long way to be realized for its different steady state, especially between old and new members. Shimizu (2010) showed that some centrifugal forces in intra-ASEAN economic cooperation such unstable domestic political situation also has contribution on slow speed of convergence in the area. The result was not much different with the study of Onwuka, Baharumsyah, and Habibullah (2006) indicating the convergence in ASEAN-5. The result indicated that ASEAN-10 has no so dissimilar steady state and income inequality was still appearing; therefore, it needed a deeper integration since integration of ASEAN gave positive result for growth. Stronger body of ASEAN secretary was required since it could accelerate the convergence in the area through agreement in policies similarities. Although the membership had positive impact on growth, Nesadurai (2003) noted that the accession of CLMV made difficulty in implementing tariff reduction obliged by CEPT scheme for huge gap between original and CLMV; moreover the contribution of CLMV for ASEAN's economy was small.

5. Comparison and Concluding Remark

Looking at the result, the Eurozone and ASEAN converged unconditionally and conditionally. For unconditional convergence ASEAN had higher speed than the Eurozone and as so for conditional convergence augmented by MC and membership dummy (see table 5 and 7). The slow convergence in both areas could be explained as the result of different state of steady state, unsynchronized market, and recession in some periods. The slower speed in the Eurozone could also be refereed to inflexibility in determining either fiscal or monetary policy in each country to solve local economic problem as the consequence of joining the Eurozone with Maastricht Criteria and since the capital labor ratio was higher (Bearce, 2009).. Since the convergence occurred when capital investment to less capital-abundant countries where return on investment was higher therefore the growth in ASEAN was higher (shown in fig 3) and contributing into higher speed than in Eurozone.



Source: created from Unstats, National Account Main Aggregate Database, available at http://unstats.un.org/unsd/snaama/dnlList.asp

Fig. 3. Real Per Capita GDP Growth of ASEAN and the Eurozone

Inflation rate had the different signs in both areas. ASEAN had negative sign; however, it was insignificant and the Eurozone had significantly positive sign (0.0003). The positive sign was, as explained by Hein (2009), the impact of the monetary policies of the ECB, which primarily committed to pursue low inflation caused a pronounced anti growth bias and have considerable asymmetric effects across the Eurozone. Interest rate had significantly negative

impact in both areas (-0.0003 and -0.0003) as we expected. Deficit ratio had positive impact in both area (0.0001 and 0.0004). Public debt (2.44E-05 and 9.45E-06) had positive influence toward growth. Exchange rate had significantly positive influence in the Eurozone (0.0019), but it was insignificant in ASEAN. This insignificance could be refereed as the effect of exchange rate was arbitrary. In one, hand the appreciation can reduce export then growth, but, in another hand, most ASEAN imports were intermediate goods used in manufacture sector.

Dummy membership variable had different sign in both areas. It has positive impact in ASEAN (0.0047), but negative impact in the Eurozone (-0.0018). The positive impact in ASEAN could be explained as the result of joining ASEAN that pushes trade creation and growth besides a positive impact of ASEAN as an emerging market and investment targeted area. The negative impact on economic growth in the Eurozone could be refereed that the joining cost was higher than benefiting from disappearance of the costs of currency exchange, related risk in economic relationship, price and employment stabilization and growth of real GDP. Lapavitsas, et.al (2010) indicated negative result came from precarious integration of peripheral[9] countries into the Eurozone, institutional bias and malfunction in the Eurozone, and the impact from imported mortgage house crisis 2007-2009.

Price stability strategy conducted by ECB as supreme body in the Eurozone contributed to low growth in the area, which was always lower than 3% and suffered from negative growth in 2009. The regression result was in line with the study of Castro (2003), who found that MC has been harmful for growth and unemployment in EU. Another perspective was proposed by Marelli and Signorelli (2010) that satisfying MC in the Eurozone will bring to nominal convergence and gradually leads to real convergence. In short term, member countries will suffered from slow growth as the result delivering monetary policy to ECB and tightening fiscal policy; but in the long run, countries will benefit from the advantage of macroeconomic stability such as price stability, fiscal discipline, removal exchange rate risks, reduction uncertainty of inflation and interest rate, and the spur of investment and international trade. All benefits would lead to higher economic growth. Table 10 showed that although the growth was low in the Eurozone after ten years the euro released, the level of nominal convergence based on MC was very high as shown by high reliability index. The contribution of monetary and fiscal stability provided by the MC was surely a step in the right direction.

Table 10 MC in Eurozone (2002-2009)

Countries	Inflation	Interest	Deficit	Debt
Austria	1.82	4.13	-1.86	61.03
Belgium	2.01	4.15	-1.28	92.03
Finland	1.57	4.08	2.75	40.70
France	1.89	4.06	-3.73	65.75
Germany	1.64	3.93	-2.42	39.53
Ireland	2.52	4.30	-1.98	34.93
Italy	2.30	4.33	-3.40	98.32
Luxemburg	2.20	3.73	1.08	8.53
Netherlands	1.92	4.06	-1.37	43.50
Portugal	2.35	4.23	-2.35	67.67
Spain	2.93	4.13	-1.43	37.88
Cyprus	2.46	4.90	-2.54	62.55
Greece	3.22	4.47	-6.37	100.59
Malta	2.45	4.81	-4.48	66.04
Slovakia	4.15	4.85	-3.83	35.58
Slovenia	3.96	5.12	-1.44	26.45
Eurozone	**2.09**	4.11	-2.66	69.92
Maastricht Criteria	**3.18**	**6.05**	**-3.00**	**60.00**
α (Reliability Index)	**0.94**	**0.95**	**0.93**	**0.85**

Source: Author's calculation

MC and membership were determining factors for growth and convergence as the model explained the phenomena around 46% (in both areas and in full model). According to Bassanini and Scarpetta (2001) fiscal policy could affect output and growth in the medium-term and over business cycle. Therefore further researches to reassess the effect of MC in the medium run was needed since judging the Eurozone as a mistake only within 10 years after released was premature, but low economic growth in short run gave a negative impression about the future of the Eurozone. Some scholars mentioned that low growth was a kind of punishment resulted either from fiscal or monetary indiscipline for more economic stability and sustain growth in future. Applying MC as a nominal convergence tool can reduce a huge gap among members with the main argument achieving zero public deficits in the medium-term and

[9] Lapavitsas, Costas, et.all (2010) included Greece, Spain, Ireland, Portugal, and Italy into it.

achieving greater budget flexibility when suffered from recession. Recent crisis in some Eurozone countries mainly was not because of MC but because of fiscal indiscipline as shown in table 10 such Greece and Portugal experienced.

ASEAN intention to fully implement ASEAN Economic Community (AEC) by 2015 as released in Cebu Summit in January 2007 had been a way to achieve a deeper integration as EU did with EMU. However, three tier income and HDI gaps among the first: Singapore and Brunei as developed countries, the second: Indonesia, Malaysia, Philippine, and Thailand as middle income countries, and the third: CLMV countries as low income countries made serious problem for the effort, not to mention the difference in political and economical system in each country. Membership enlargement, either in ASEAN or the Eurozone, faced some challenge. The economic gap between new and old members could create serious economic problem especially if the area failed in absorbing an asymmetric shock. Concerning the significant impact of MV in determining convergence, in some extent MC could be used as a tool to diminish the problem and pushed the area into convergence.

Learning from the Eurozone experience, if ASEAN has an intention to achieve full economic integration with a common currency in line with AEC target, it should consider nominal convergence transformed to real convergence to avoid that the cost of creating common currency is higher than its benefit. Although MC was not very determinant factor influencing growth either in the Eurozone or ASEAN, the criteria have significant and key roles in minimizing more risk from crisis as recent crisis suffered by Greece showed it. Therefore with some accomplishing, ASEAN can use MC either for stability or creating a common currency in future.

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