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THE ASEAN-5 FUTURE CURRENCY: MAASTRICHT CRITERIA

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ABSTRACT

In this recent decade, many of the economists and policymakers attempted to investigate the suitability of the East Asian region to form a currency union and based on the European countries experience as a benchmark. This study aims to investigate the long-run real convergence in GDP per capita growth among Malaysia, Thailand, Singapore, Indonesia, and the Philippines, over 1978 to 2004. The Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) unit root tests were conducted at first difference of GDP per capita for each country; the results demonstrated that all countries GDP per capita are stationary at first difference. The results of the Bound Testing Approach (Auto-Regression Distributed Lag (ARDL)) indicated that there is a long run relationship between variables in the Maastricht Criteria. The results showed that interest rate, inflation rate and the debt ratio experience that negative relationship to the GDP per capita. However, the exchange rate and surplus (or deficit) ratio shown the positive related to the GDP per capita. Therefore, the findings showed the ASEAN 5 countries have fulfilled the Maastricht Criteria with consistent to expected sign(s) except for Singapore' exchange rate and Indonesia's debt ratio. Hence, those ASEAN 5 countries in this study have potential to form a single currency.

Keywords: *Monetary Union (MU), Bound Test (ARDL), Maastricht Criteria, Single Currency.*

INTRODUCTION

The single currency can simply define as a monetary unit that is shared by several countries. According to Zhang and Lan (2005) and Fabella (2002), a currency union is a zone consisting of several countries or regions where (i) a single currency circulates; (ii) a single monetary authority implements monetary policy defined at the union level; (iii) a single exchange policy prevails; (iv) the single monetary authority maintains a common pool of reserves; and (v) in the absence of political integration.

The suitability for East Asia to form a monetary union has long been under discussion of economists. Especially after the 1997's financial crisis and the launch of euro, financial and monetary cooperation in East Asia attracts much more attention (Zhang and Lan, 2005). There is great deal of interests in a single currency and in integrating the region's economies came about after the Asian financial crisis in July 1997 (Jin, 2002). According to Roberto (2004), the financial crisis put at the forefront of the regional cooperation agenda the need to focus on one important dimension – monetary and financial cooperation – with a view to enhancing East Asia's resilience to future shocks. In addition, in an increasingly globalizing world, there is likely to be a greater synchronization of business cycles. Hence, the benefits of having fewer

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currencies to conduct cross-border business, especially at the regional level, are likely to increase.[2] Therefore, the Asian countries should consider whether to follow the global trend toward currency consolidation by moving toward the adoption of a single currency over the long run which refers to the Economic and Monetary Union (EMU) experience as a background.

The study on the formation of a currency union especially for Asian countries such as the one conducted by Thornton and Goglio (2002) have found evidence supporting the forming of a monetary union in Asia. They adopted a Gravity Model of trade and confirmed the importance of economic size, geographic distance and common language in intra-region bilateral trade and also showed that re-exports and the ASEAN countries have been important factors promoting intra-regional trade. Besides, Ng (2002) employed the structural VAR model and long run coefficient matrix methods to test the factors related to a formation of Monetary Union in Southeast Asia. The empirical result showed that the large tradable sectors had promoted intra-regional trade with the narrowing of the inflation rate gap in the region. Nevertheless, there are opposite result shown by Sharma and Chua (2000), which argues that ASEAN integration scheme did not increase the intra-ASEAN trade. However, the trade in ASEAN among the members of APEC group increases with the size of the economy.

Following the European experience, a selected group of countries should first exhibits some level of economic convergence *prior* to form a more intensive economic cooperation. In 1992, the Maastricht Convergence Criteria represented the first great step toward the creation of an Economic and Monetary Union (EMU) in Europe[3]. These criteria order that growth in EMU countries is sustainable, it is indispensable that there has previously existed a high degree of homogeneity between their economies in what corresponds to the principal characteristics, and it is to this procedure of homogeneity which is designated convergence. These convergence criteria are the satisfaction of which produced a monetarily and fiscally stable environment and guaranteed membership in an economically integrated Europe. If the countries fulfill all the required criteria, then it demonstrates that these countries are ready to join the union (M. Azali and Shafinaz, 2006).

According to Afxentiou and Serletis (2000), they estimated the significance of the Maastricht Convergence Criteria in promoting to overall economic growth in the European Union member states. In their study, they have employed the fiscal criteria

[2] Asian Development Bank President Tadao Chino told a seminar, "A Single Currency for East Asia: Lessons from Europe," in Jeju.

[3] The Maastricht criteria were:

- Government budget deficit of less than 3% of GDP;
- Government national debt of less than 60% of GDP;
- Price stability: an average rate of inflation no more than 1.5 percentage points above that of the three best performing member states;
- Convergence of the interest rates between countries: an average nominal long-term interest rate not more than 2 percentage points above that of the three best performing member states;
- Exchange rate stability: participation in the normal bands of the Exchange Rate Mechanism for at least two years without devaluations.

All the above criteria were required to be fulfilled by 1999.

(general government deficit ratio and public debt ratio) and monetary criterion (inflation rate), to serve as a benchmark for membership qualification into the monetary union. Afxentiou and Serletis (2000) adopted the Ordinary Least Square (OLS) to test the hypothesis that the Maastricht Convergence Criteria are conclusive to real per capita income growth by using the following equation:

$$g_t = \beta_0 + \beta_1 INFL_t + \beta_2 DEFG_t + \beta_3 DEBG_t + \varepsilon_t \quad (1)$$

where g_t is GDP per capita growth rate, INF is inflation rate, DEFG is deficit per GDP ratio, and DEGB is debt per GDP ratio. In this model, β_1, β_2 and β_3 are expected to be negative.

In this study, the extension model is conducted to test the hypothesis of Maastricht Criteria by using the most recent econometric methodology – the "Bound test" proposed by Pesaran, *et al.* (2001). According to Elias and Castro (2004), the extended model involves a set of policy and institutional factors related to the Maastricht Criteria, such as, deficit and debt ratios, inflation and interest rates and exchange rate variability. This augmented convergence equation is consistent with the notion of conditional convergence. Hence, the Maastricht criteria could be investigated by the following extension model:

$$\Delta GDP_t = \beta_0 + \beta_1 GDP_{t-1} + \beta_2 EXCH_{t-1} + \beta_3 INT_{t-1} + \beta_4 INFL_{t-1} + \beta_5 DFC_{t-1} + \beta_6 DBT_{t-1} +$$

$$\sum_{i=1}^{a} \beta_{7,i} \Delta GDP_{t-i} + \sum_{i=0}^{b} \beta_{8,i} \Delta EXCH_{t-i} + \sum_{i=0}^{c} \beta_{9,i} \Delta INT_{t-i} + \sum_{i=0}^{d} \beta_{10,i} \Delta INFL_{t-i} +$$

$$\sum_{i=0}^{e} \beta_{11,i} \Delta DFC_{t-i} + \sum_{i=0}^{f} \beta_{8,i} \Delta DBT_{t-i} + \upsilon_t \quad (2)$$

where the GDP is GDP per capita, EXCH is ln exchange rate variability, INT is interest rate, INFL is inflation rate, DFC is surplus (deficit) per GDP ratio, and DBT is debt per GDP ratio, Δ is the first difference operator, and v_t is the white noise disturbance term. In this study, the GDP per capita and the exchange rate variability are expressed in logarithms. This method is applied to investigate whether these convergence criteria are also appropriate for standard measurement of economic performance of Asian region. In another word, we want to analyze whether ASEAN 5 are ready to form a monetary union based on the standard of Maastricht convergence criteria.

The remainder of the paper is organized as follows. Section II explains the sources of data and the set-up of the econometric methodologies used. Empirical result and discussion are described in Section III. The final section summarizes some conclusions from the results and discusses some implications of the findings.

II. Data and Methodology

II.(a) Data Analysis

In this study, the objective is to investigate the long-run real convergence in Gross Domestic Product (GDP) per capita growth among ASEAN 5 countries, namely Malaysia, Thailand, Singapore, Indonesia, and The Philippines. The Maastricht Convergence criteria are represented by exchange rate, interest rate, inflation rate, general government surplus or deficit ratio, and public debt ratio. Moreover, the proxy of exchange rate is measured by algorithm domestic currency per US Dollar variability; interest rate is measured by money market rate; inflation rate is measured as a percentage of changes in Consumer Price Index (CPI); the government overall budgetary surplus or deficit is measured in a percentage of GDP; and the public debt is measured in the percentage of GDP. Moreover, the economic growth for each country is measured by the country's algorithm GDP per population. The data for the variables such as the exchange rate, inflation rate, interest rate, and GDP per capita were obtained from International Financial Statistics (IFS) published by the International Monetary Fund (IMF). For government budget surplus or deficit ratio and total debt ratio, the data were collected from the website of Asian Development Bank (ADB), Organization for Economic Cooperation and Development Statistics (OECD.stat), and World Development Indicators (WDI). Furthermore, the data are of annually frequency spanning from 1978 to 2004.

II.(b) Bound Testing Approach[4]

This study applies Pesaran, *et al*. (2001) Bound Test approach to investigate the long-run relationship between economic growth and some control variables. According to Pesaran, *et al.* (2001), the Bound Test approach allows the independence variables in the function be I(0) or I(1), however the dependence variable must be I(1). First, we will conduct the Unit Root Tests – Dickey-Fuller (1979), Augmented Dickey Fuller (ADF) tests, [5] and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) (1992) test to check the stationarity of the GDP per capita for each country. Second, we use the Auto-Regression Distributed Lag (ARDL) approach and base on the Maastricht Criteria as a benchmark for testing the monetary and fiscal policy lead to the long-run economy growth for the each country. Based on Maastricht Treaty, the sign of control variables in the long-run growth model is important to determine which country will benefit more in joining to form a single currency. In addition, the advantage of using the Bound Test approach to testing the Maastricht Criteria is it can shows the signs and long-run elasticities by using difference lags in the model.[6]

Therefore, in this study the model is conducted to test the hypothesis of Maastricht Criteria by using the most recent econometric methodology – the "Bound test" approach and proposed by Pesaran, *et al.* (2001). According to Elias and Castro (2004), this model should be involves a set of policy and institutional factors related to the Maastricht Criteria, such as, deficit and debt ratios, inflation and interest rates, and

[4] See also Choong et. al. (2005).
[5] This Augmented Dickey-Fuller test is referring to S. E. Said and D. A. Dickey (1984): Testing for Unit Roots in Autoregressive-Moving Average Models of Unknown Order. *Biometrika* **71**, 599–607.
[6] The details of the Bound Test approach is can refer to the Pesaran, et al. (2001).

exchange rate variability. This augmented convergence equation is consistent with the notion of conditional convergence. Hence, the Maastricht criteria could be investigated by the following model:

$$\Delta GDP_t = \beta_0 + \beta_1 GDP_{t-1} + \beta_2 EXCH_{t-1} + \beta_3 INT_{t-1} + \beta_4 INFL_{t-1} + \beta_5 DFC_{t-1} + \beta_6 DBT_{t-1} +$$

$$\sum_{i=1}^{a} \beta_{7,i} \Delta GDP_{t-i} + \sum_{i=0}^{b} \beta_{8,i} \Delta EXCH_{t-i} + \sum_{i=0}^{c} \beta_{9,i} \Delta INT_{t-i} + \sum_{i=0}^{d} \beta_{10,i} \Delta INFL_{t-i} +$$

$$\sum_{i=0}^{e} \beta_{11,i} \Delta DFC_{t-i} + \sum_{i=0}^{f} \beta_{8,i} \Delta DBT_{t-i} + \upsilon_t \qquad (3)$$

where the GDP is Gross Domestic Productivity per capita (GDP per capita), EXCH is ln exchange rate variability, INT is interest rate, INFL is inflation rate, GSP is government surplus per GDP ratio, and DBT is debt per GDP ratio, Δ is the first difference operator, and v_t is the white noise disturbance term. In this study, the GDP per capita and the exchange rate variability are expressed in logarithms. This method is applied to investigate whether these convergence criteria are also appropriate for standard measurement of economic performance of Asian region. In another word, we want to analyze whether Asian countries are ready to form a monetary union based on the standard of Maastricht convergence criteria.

III. Results and Interpretations

The empirical results of the ADF (DF) tests for GDP per capita country by country at the level and first difference are reported in Table 1. The results of DF/ADF test showed that the t-statistic for all country in their level is statistically insignificant, hence failed to reject the null hypothesis of non-stationary at the 10% significance level. This implied that these countries are non-stationary at their level in models without trend and with trend. Therefore, these variables either contain a unit root process, or they share a common stochastic movement. However, when the DF/ADF test were conducted at first difference of each country, the results demonstrated that all countries are stationary at least 10% significance level. Therefore, can conclude that all countries GDP per capita are integrated of order one.

TABLE 1

The Bound test approach is applied to examine the long-run relationships between the GDP per capita and its determinants. The Auto-Regression Distributed Lag (ARDL) model was used to estimate the model based on equation (6). The results of the estimated ARDL model based on country by country basis are reported as Table 2. Using the Hendry's general to specific method, the goodness of fit of the specification (adjusted R-squared) and the standard error of regression remain superior.

TABLE 2

In addition, Table 2 several diagnostic tests are used to confirm the validity of the model such as Breusch-Godfrey Serial Correlation LM test, ARCH test, and Jacque-Bera normality test. All these tests implicated that the model has the desired econometric properties, namely the residuals are serially uncorrelated and normally distributed, homoscedasticity and has a correct functional form.

Based on Table 3, the results of bound Cointegration test obviously demonstrated that the null hypothesis of $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$, against its alternative $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq 0$ is easily rejected at 1% significance level. The computed F-statistic (Wald Test) is 8.8484 for Malaysia, 9.2345 for Singapore, 9.7662 for Thailand, 9.3646 for the Philippines, and 88.32 for the Indonesia, which is greater than the upper critical Bound value of 4.68. Therefore, based on the test results, we can conclude that there exists a steady state long run relationship for each country among the GDP per capita, exchange rate, interest rate, inflation rate, deficit or surplus ratio, and debt ratios.

TABLE 3

Table 4, reported the long run elasticities between the variables using the Maastricht Criteria. The empirical result showed that most of the countries have a significant positive long-run relationship between the GDP per capita and the exchange rates. In particular, Malaysia, Thailand, the Philippines, and Indonesia significantly influence GDP per capita with the positive estimated elasticities of 5.4716, 9.1286, 11.5735, and 17.7007, respectively. For example, the estimated coefficient implies that if Malaysian ringgit depreciates (i.e., RM/US$ increase 1%), then this will raise the domestic GDP per capita growth by 5.47%. However, only Singaporean dollar have an opposite effect on GDP per capita growth with estimated parameters of -1.8071. According to Marshall-Lerner condition, if the summation of the estimated coefficient of both export and import are below unity, then the devaluation strategy may even worse off the country's international trade condition. Therefore, the reverse relationship also implies that the Singapore government cannot heavily rely on the devaluation strategy in improving its competitiveness in the international markets (Choong et, al. 2005).

TABLE 4

All estimated countries experienced that the interest rate and GDP per capita growth in the Convergence Criteria have a negative relationship and these has consistent with the expected sign at the long run. In this study, all countries' interest rates (Malaysia, Singapore, Thailand, the Philippines, and Indonesia) are significantly influence economic growth with the negative estimated elasticities of -0.1728, -0.1366, -0.1045, -0.1556, -0.2524, -0.1187, and -0.1298, respectively. For example, when 1% decreases in the interest rate will affect to the GDP per capita growth by 0.17% (Malaysia), 0.14% (Singapore), 0.10% (Thailand), 0.16% (the Philippines), and 0.25% (Indonesia), respectively.

The empirical result showed a negative long-run relationship between the inflation rate and the GDP per capital. All countries' inflation rates are reversely

influence the economic growth with the negative estimated elasticities of -0.1586 (Malaysia), -15.5893 (Singapore), -12.2531 (Thailand), -6.0768 (The Philippines), and -1.8664 (Indonesia), respectively. If the country experienced a decrease in inflation rate by 1%, this will affect the GDP per capita growth by 0.16% (Malaysia), 15.59% (Singapore), 12.25% (Thailand), 6.08 (The Philippines), and 1.87 (Indonesia), respectively.

The surplus or deficit ratio significantly influence economic growth with the positive estimated elasticities of 9.0626 (Malaysia), 12.9654 (Singapore), 10.786 (Thailand), 6.4552 (The Philippines), and 25.7992 (Indonesia), respectively. This empirical result is consistent with the expected sign. If the country increases the surplus ratio by 1%, this will lead to an increase in GDP per capita growth by 9.06% (Malaysia), 12.97% (Singapore), 10.79% (Thailand), 6.46% (The Philippines), and 25.79% (Indonesia), respectively.

In this study, the debt ratios showed the opposite reward to the economic growth. There are significantly influence economic growth with the negative estimated elasticites of -4.8613 (Malaysia), -0.52723 (Singapore), -6.1268 (Thailand), and -0.2997 (the Philippines), respectively. This implicated that, when the country experienced higher indebtedness, this will lower the domestic GDP per capita. This means that a decrease in the debt ratio of the country by 1% would increase the GDP per capita by 4.86% (Malaysia), 0.53% (Singapore), 6.13% (Thailand), and 0.29% (the Philippines), respectively. In contrary, Indonesia has a positive relationship between the debt ratios and GDP per capita growth with the positive estimated elasticities of 12.9949. However, according to Hall and Lieberman (2005), as long as the nation's income is growing at least as fast as total interest payments on debt, the debt can continue to grow indefinitely, without putting the government in dangers.

From the findings discussed above, how to interpret the empirical results of long run relationship between government policies (monetary and fiscal policy) and growth especially impacts of Maastricht criteria on GDP per capita growth? The Maastricht Criteria dictates each country's behaviour before, as well as after its eligibility to the monetary union. In this study, several empirical evidence found to support the hypothesis of Maastricht Criteria led growth in long run. The empirical result can conclude that all variables in the convergence criteria for the majority's countries are similarly an expected sign(s). This indicated that countries with all similar expected sign(s) are judged to benefit the most from their conformity to the Maastricht convergence criteria (Afxentiou and Serletis, 2000). Monetary stability and fiscal discipline are shown to overall contribute substantially to economic progress and GDP per capita income convergence in the ASEAN 5 countries. Hence, those ASEAN 5 countries in this study have potential to form a single currency after fulfill the Maastricht Criteria.

IV. Conclusion

The purpose of this paper is to comprehensively investigate the long-run real convergence in GDP per capita growth among Malaysia, Thailand, Singapore, Indonesia, and the Philippines, over 1978 to 2004. The bound Cointegration procedure introduced

by Pesaran, *et al.* (2001) was applied to achieve this main purpose. Several conclusions could be drawn from the analysis. Firstly, there exists a stable long-run relationship among GDP per capita, exchange rate variation, interest rate, inflation rate, surplus or deficit ratio, and debt ratio. Secondly, the Unrestricted Error Correction Model (UECM) indicates that exchange rate variability, and Debt ratio has a positive impact on economic growth in long run, while interest rate, inflation rate, and debt ratio have a negative relationship with economy growth in long run. Finally, this study shown that ASEAN 5 countries has been fulfilled the Maastricht Criteria which is consistent with expected sign(s). These implied that economic policy in ASEAN 5 countries experienced the potential of economic productivity growth and supporting the ASEAN 5 countries to form a monetary union which is beneficial according to the Maastricht Criteria.

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Table 1: Results of the Unit Root Tests for GDP per Capita

	DF / ADF Test			
	Level		First Different	
Variables	**Constant No Trend**	**Constant Trend**	**Constant No Trend**	**Constant Trend**
Malaysia	-0.4511 [n] (3)	-2.4162 [n] (3)	-4.0529*** (1)	-3.8505** (1)
Thailand	-1.1462 [n] (3)	-0.9026 [n] (3)	-3.4965** (0)	-3.8214** (0)
Singapore	-0.8964 [n] (3)	-1.9439 [n] (3)	-2.9958** (1)	-4.3565** (0)
The Philippines	-1.8904 [n] (3)	-1.4005 [n] (3)	-3.0276** (2)	-4.4621*** (3)
Indonesia	0.6601 [n] (3)	-2.6387 [n] (3)	-3.6962** (1)	-3.6092* (1)

***Note**: ***, **, and * denote significant at 1%, 5%, and 10% significance levels, respectively. The [n] denotes non-significant and figures in parentheses () refer to the selected lag length..*

Table 2 The Estimated ARDL Model Based on Equation (3)					
Variable	**Malaysia**	**Singapore**	**Thailand**	**The Philippines**	**Indonesia**
LNGDP(-1)	-0.4341** (0.0137)	-0.3086*** (0.0056)	-0.1689*** (0.0015)	-0.0801*** (0.0015)	-0.0255** (0.0323)
EXCH(-1)	2.3755** (0.0354)	-0.5577** (0.0256)	1.5426*** (0.0029)	0.9277*** (0.0013)	0.4520*** (0.0007)
INT(-1)	-0.0750** (0.0170)	-0.0421** (0.0383)	-0.0176*** (0.0039)	-0.0124* (0.0610)	-0.0064*** (0.0040)
INFL(-1)	-0.0688 (0.9681)	-4.8111* (0.0612)	-2.0706** (0.0189)	-0.4871** (0.0414)	-0.0476 (0.6320)
DFC(-1)	3.9346*** (0.0076)	4.0013** (0.0180)	1.8227** (0.0181)	0.5174 (0.5373)	0.6588** (0.302)
DBT(-1)	-2.1105** (0.016)	-0.1627 (0.5025)	-1.0353*** (0.0032)	-0.0240 (0.8536)	0.3318*** (0.0026)
R-squared	0.9474	0.9706	0.9919	0.9555	0.9990
Adjusted R-squared	0.7689	0.8385	0.9647	0.8443	0.9935
Standard Error of regression	0.0294	0.0245	0.0097	0.0229	0.0055
F-Statistic P-value	5.3073** (0.0370)	7.3480** (0.0331)	36.4586*** (0.0004)	8.5966*** (0.0071)	181.2503*** (0.0005)
II. Diagnostic Checking					
i.) Autocorrelation (Breusch-Godfrey Serial Correlation LM Test):	5.2765 (0.1041)	1.2709 (0.4403)	2.4079 (0.2378)	2.6115 (0.1670)	1.0981 (0.5593)
ii.) ARCH Test:	1.8716 (0.1732)	0.3148 (0.5809)	2.2973 (0.1103)	0.4060 (0.5315)	0.3320 (0.5715)
iii.) Jacque-Bera Normality Test:	0.4497 (0.7986)	0.9852 (0.6110)	0.1235 (0.9400)	0.7706 (0.6802)	2.5941 (0.2733)
Note: ***, ** and * denote significant at 1%, 5%, and 10% significance levels. The figures in parentheses () refer to the probability.					

Table 3: Bound Test Based on Equation (3)					
Country	**Malaysia**	**Singapore**	**Thailand**	**The Philippines**	**Indonesia**
Computed F-statistic	8.8484***	9.2345***	9.7662***	9.3646***	88.32***
Null Hypothesis : No Co-integration					
				Critical Value	
				Lower	Upper
1% significance level				3.41	4.68
5% significance level				2.62	3.79
10% significance level				2.26	3.35
Decision: Reject null hypothesis at 1% significance level					

Note: The critical values are taken from Pesaran *et. al.* (2001), Table CI (iii) Case III: Unrestricted intercept and no trend. Page 300.

***, ** and * denote significant at 1%, 5%, and 10% significance levels.

Table 4: Summary of the result for ARDL tests - Long Run Elasticities

COUNTRY	MALAYSIA	SINGAPORE	THAILAND	PHILIPPINES	INDONESIA
EXCHANGE RATE (+)	5.4716**	-1.8071** (n.e)	9.1286***	11.5735***	17.7007**
INTEREST RATE (-)	-0.1728 **	-0.1366**	-0.1045***	-0.1556*	-0.2524**
INFLATION RATE (-)	-0.1586 (n.s)	-15.5893*	-12.2531**	-6.0768**	-1.8664 (n.s)
DEFICIT OR SURPLUS RATIO (+)	9.0626***	12.9654**	10.786**	6.4552 (n.s)	25.7992**
DEBT RATIO (-)	-4.8613**	-0.52723 (n.s)	-6.1268***	-0.2997 (n.s)	12.9949* (n.e)

Note: ***, ** and * denote significant at 1%, 5%, and 10% significance levels, respectively. The sign(s) in the parentheses are the expected sign according to the theoretical review. The (n.s) denotes non-significant and the (n.e) denotes the country not similar expected sign(s) in the model.