Volume: 3 Issue: 10 [June, 2018] pp. 20-27
Journal of Islamic, Social, Economics and Development
eISSN: 0128-1755
Journal website: www.jised.com

COINTEGRATION AND ASYMMETRIC ADJUSTMENT BETWEEN POLITICAL INSTABILITY AND ECONOMIC GROWTH: EVIDENCE FROM THAILAND

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Accepted date: 30 Oktober 2017 **Published date:** 10 June 2018

To cite this document: Yan-Teng Tan, Chia-Guan Keh, Chin-Yu Lee, Yoke-Chin Kuah, Siu-Eng Tang (2018). Cointegration and Asymmetric Adjustment Between Political Instability and Economic Growth: Evidence from Thailand. *Journal of Islamic, Social, Economic and Development (JISED)*, 3 (10), 20-27.

Abstract: *The purpose of this paper is to empirically determine whether the cointegration and asymmetric adjustment exist in the relationship between political instability and economic growth in Thailand. Data period selected from year 1980 to 2013. Even though Threshold Autoregressive (TAR) model does not provide any evidence of cointegration between these two variables, this paper continues to carry on with Momentum Threshold Autoregressive Model (MTAR). As a finding, the asymmetric adjustment between political instability and economic growth occurred in Thailand.*

Keywords: *political instability, economic growth, cointegration, asymmetric adjustment*

Introduction

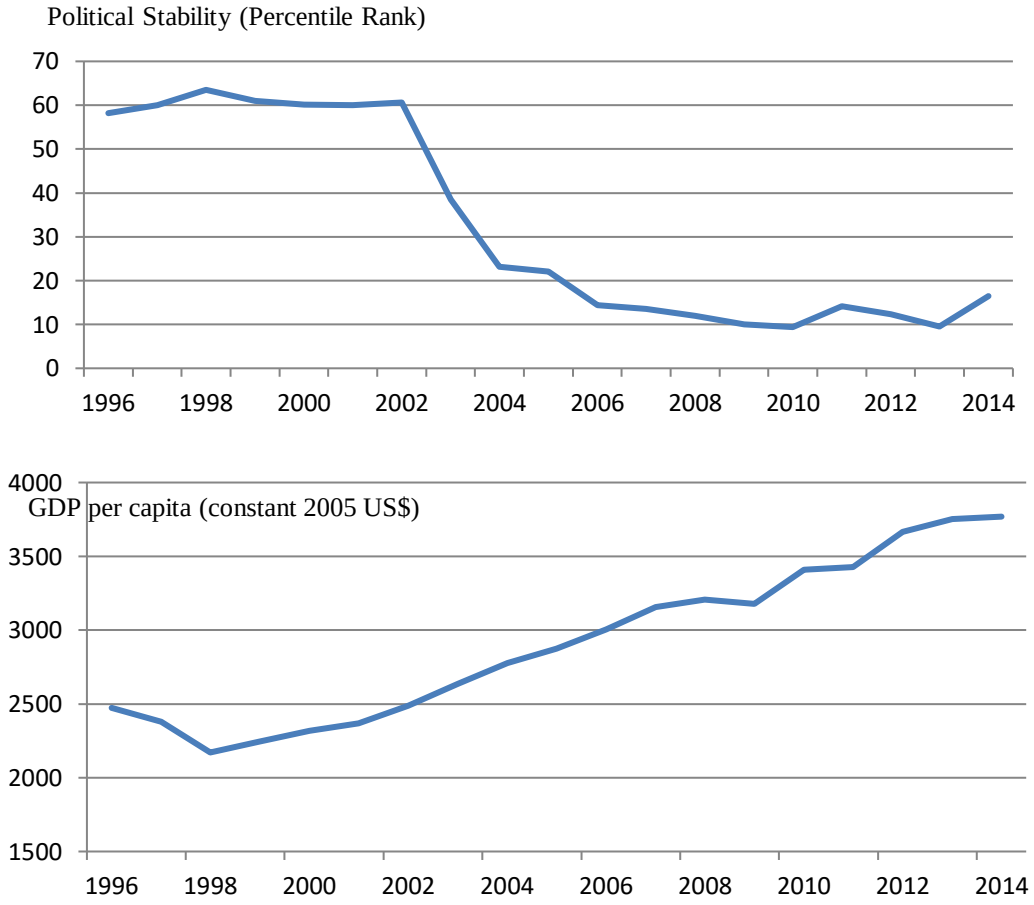
Political instability is defined by economists as a serious dissatisfaction to economic growth (Aisen & Veiga, 2013). Aisen and Veige (2013) found that higher levels of political instability tend to limit the policymaker's capacity to make long term planning concerning macroeconomics policy and performing the said policies. Suboptimal short term macroeconomic policies, frequent switch of policies, as well as uncertainty that associated with political instability are believed to have negative effect on macroeconomic performance.

According to Jong-a-Pin (2009), if a country is politically unstable, it will tend to have sluggish economic performance. Political instability as measured by important political change events, including autocratic backsliding, executive auto-coup, revolution, collapse of central authority (state failure), and successful military coups.

Since the formation of its constitutional monarchy in 1932, military coups have been a great part of Thailand's history. Many believed that the establishment of the democracy in 1992 will put the country on a new path, anticipating a more stable government by the extraction of military's intervention from politics. After a relatively long-time span between the 1992 and 2006, while many believed that democracy had been consolidated in Thailand, the military intervention is back to scene. In 2006, the military seized the power from Prime Minister Thaksin Shinawatra and his Thai Rak Thai Party, forming a military led government. Ever since the 2006 coup, the government remain unstable even after the return of the government to the elected official in 2007.

Despite the political instability, Thailand's economy grew at an average of 7.5% in the boom years of 1960 to 1996 and slow down to 5% during 1999-2005. Average growth rate lower to 3.5% over the period of 2005-2015. In fact, Thailand only experienced inverse growth in both incidences of 1997 Asian Financial Crisis and 2008 Subprime Mortgage Crisis. Figure 1 shows the political stability and economic growth in Thailand during 1996-2014. Gross domestic product per capital grew steadily although the political stability is deteriorating. A country with an unstable politic is believed to have poor economic performances. But this is not true in the case of Thailand.

Figure 1: Political Stability and economic growth in Thailand during 1996-2014



(Source: Country Data Report for Thailand, 1996-2014, World Bank)

Cointegration between political instability and economic growth has been widely tested with mixed results. Most of these tests assume symmetric adjustment. However, it is widely acknowledged that many important macroeconomic variables display asymmetric adjustment paths. Yet there is inadequate number of studies on the asymmetric cointegration. Therefore, this paper aims to examine the cointegration and asymmetric adjustment between political instability and economic growth in Thailand by applying Threshold Autoregressive (TAR) and Momentum Threshold Autoregressive Model (MTAR) technique suggested by Enders and Siklos (2001).

Literature review

The role of political variables in economic performance has been receiving increasing attention in the literature. In particular, there are some studies on this issue have provided conflicting results (e.g. Tang and Abosedra, 2014; Gurgul and Lach, 2013; Aisen and Veiga, 2013; Campos, Karanasos and Tan, 2012, Jong-A-Pin, 2009; Fosu, 2001)

Started from Fosu (2001), he has looked in detail the links between growth and political instability in the UK. The evidence of a negative effect of political instability on UK GDP growth from simple linear regressions is followed by evidence from GARCH models including political instability proxies in the growth with a negative impact. Followed by Jong-A-Pin (2009), they examine the causal impact of political instability on economic growth using a dynamic panel system Generalized Method of Moments model and find that instability of the political regime has a robust and significant negative effect on economic growth. Within a power-ARCH framework using data for Argentina from year 1896 to year 2000, Campos, Karanasos and Tan (2012) found that political instability have negative effect on economic growth in Argentina. They concluded that political protest tends to disrupt productive activites, thereby negatively affecting economic growth. According Gurgul and Lach (2013), political instability defined as a propensity for government change. They showed that negative impact on growth in 10 CEE countries from year 1990 to year 2009. They mentioned that economists usually feel stress when unstable political system occur and cause investment slow down or speed up inflation, and in consequence reduce the GDP growth rate in the particular country. Another major factor cause's the fall of a government is social tensions and political instability. Aisen and Veiga (2013) found that higher degrees of political instability will lower GDP growth rate per capita by using the system-GMM models in 169 countries from year 1964 to year 2004. Using panel data analysis of 24 countries in the Middle East and North African (MENA) region from year 2001 to year 2009, Tang and Abosedra (2014) found that negative consequences of uncertainty associated with political instability and accelerate the growth of the region.

However, Ali (2001) showed that effect of political instability on economy growth is not conclusive. His result showed that policy stability has a more dramatic and significant impact on growth than political instability. Alesina et al. (1996) use data on 113 countries from year 1950 to year 1982 to show that GDP growth is significantly lower in countries with a high propensity of government collapse. In a more up-to-date study, Jong-a Pin (2009) further characterize the political instability into another 4 features. Their study shows that the four features have non-identical effects on economic growth. Only the volatility of the political scheme has a noteworthy inverse impact on economic growth.

Political instability also leads to higher inflation and slow economic growth as shown in Aisen and Veiga (2006). The study encompasses a dataset from 1960 to1999 for 100 countries. The result of the study shows diminishing social welfare as well as economic growth due to high inflation rates. In the case of Pakistan, based on empirical result using data 1951-2007, Safdar and Omar (2011) revealed that political instability leads to low GDP growth.

In a nutshell, based on most of the researches done, political instability has adverse effect on economic growth indicated by various macroeconomic indicators. Besides, enormous researches have been done on symmetric adjustment. There is small number of studies on the asymmetric adjustment on political instability and economic growth. Therefore, this paper emphasizes on examining the asymmetric co-integration between political instability and economic growth in the case of Thailand.

Methodology

The expected model between economic growth and political instability is shown as equation (1). Gross domestic product per capita is applied as a proxy of economic growth obtained from World Bank Data. Meanwhile, Political competition is employed as a proxy of political instability obtained from Polity IV report. The data is collected from year 1980 to 2013. Natural logarithm is applied for all variables.

$$GDP_t = \beta_0 + \beta_1 PI_t + u_t \quad (1)$$

where GDP refers to gross domestic products, PI is measured the political instability and u_t is error term .This paper will carry out the Unit Root tests, which consist of Augmented Dickey-Fuller (ADF) and Phillips Perron (PP) to verify whether they are stationary at first differencing, I(1). Unit root test is necessary to observe the stationary of the series of variables. Stationary is a characteristic element of time series which shows a clear dependence over time. Stationary is important since it is an assumption of an error terms in the classical regression model.

For testing the unit root, we apply Augmented Dickey-Fuller (ADF) test which is created by Dickey and Fuller (1981). ADF is an advance edition of Dickey-Fuller test for a more complicated and huge set of time series data and taken into account for lagged terms. ADF sets null hypothesis as series is non-stationary. According to ADF statistics, if the rejection is significant towards the hypothesis that there is a unit root at certain confidence level, it is assumed that the greater the negative value is. Significance level of 1%, 5% and 10% are applied to conduct the stationary test. On the other hand, Philips Perron (PP) unit root test is the most frequently used alternative to the ADF test. PP test set null hypothesis as series is non stationary and employ the significance level of 1%, 5% and 10% as well. Decision rule of PP test is rejecting null hypothesis when the critical value more than test statistic same as ADF.

The type of form in level and first difference would be performed by ADF and PP test. It concludes that related variables are integrated of order one or I(1) if null hypothesis is rejected at first difference. After that, this paper will assume that the residual is symmetric with the adjustment process in the long-run and the specification is shown as below:

$$\Delta\mu_t = \rho\mu_{t-1} + \sum_{i=1}^{q} \delta_1 \Delta X_{t-1} + v_t \quad (2)$$

Yet, the adjustment can also be asymmetric. This paper starts with categorising residuals into two parts as above threshold and below threshold. To provide residuals have asymmetric adjustment, this paper amend Equation (2) into

$$\Delta\mu_t = I_t\,\rho_1\mu_{t-1} + (1-I_t)\rho_2\,\mu_{t-1} + \sum_i^{p-1}\gamma_i\Delta\,\mu_{t-1} + \varepsilon_t \quad (3)$$

Dummy variable τ named Heaviside indicator function is adopted to develop the above and below threshold, where

$$Tt = \begin{cases} 1 & if\ \mu\, t-1 \geq \tau \\ 0 & if\ \mu t-1 < \tau \end{cases} \quad (4)$$

$$Mt = \begin{cases} 1 & if\ \Delta\mu\, t-1 \geq \tau \\ 0 & if\ \Delta\,\mu t-1 < \tau \end{cases} \quad (5)$$

The divergence from the equilibrium in level or long run is captured by Threshold Autoregressive Model (TAR) model. In the meantime, a change in the deviation is demonstrated by Momentum Threshold Autoregressive Model (MTAR). The adjustment coefficient is $\rho_2\mu_{t-1}$ if μ_{t-1} is below the threshold whereas the adjustment coefficient is $\rho_1\mu_{t-1}$ if μ_{t-1} is above the threshold.

Moreover, this paper assume that no cointegration on null hypothesis, $H_0 = \rho_1 = \rho_2 = 0$. If the proposed critical value is less than the F-statistic, null hypothesis should be rejected and proceed to the F-equality for the purpose of examining the asymmetric adjustment on null hypothesis, where $H_0 = \rho_1 = \rho_2$.

Error correction model (ECM) is applied where the error correction is the lagged one time period residuals after detecting cointegration. The ECM would be demonstrated as below if asymmetric adjustment is identified,

$$\Delta GDP_t = \alpha + \rho_1 I_t u_{t-1} + \rho_2(1-I_t)u_{t-1} + \sum_{t=1}^{k1} GDP_{t-1} + \sum_{t=1}^{k2}\Delta PI_{t-1} + \varepsilon_t \quad (6)$$

where the positive shock exists in the speed of adjustment coefficients of GDP denoted as ρ_1 whereas negative shock exists in the speed of adjustment coefficient denoted as ρ_2.

Empirical Result

Unit Root Test Results

Table 1 shows the result of ADF and PP test at level and first difference form. Nevertheless, null hypothesis fails to be rejected by all the variables at level form. All variables are integrated at first difference form at 1% significance level. The consistency result showed in ADF and PP. Therefore, all the variables are stationary at first difference and proceed to cointegration test.

Table 1: Unit Root Test

Variables	Level	
	ADF	PP
GDP	-0.797	-0.829
PI	-2.833	-2.756
Variables	First difference	
	ADF	PP
GDP	-4.435***	-4.368***
PI	-7.881***	-8.496***

Notes: *** denotes 1% significance level

Cointegration Test

Ordinary Least Square (OLS) is employed by this paper for estimating the long run equation. Estimated long run equilibrium relationship (with t-statistic in parentheses) is shown as below:

$$GDP_t = 4.698 + 0.027\ PI + u_t \quad (7)$$
$$(0.051)\quad (1.157)$$

Based on the equation, political instability is positively and insignificantly associated with the economic growth. The main reason is Thai economy focus on export, and as long as political instability does not disturb much the flow of export, it will affect much on economic growth.

Subsequently, based on the OLS equation, Engle-Granger cointegration test is carried out and unit root is used to test for residuals. Stationary of the residual must be complied for cointegrated between two variables. The ADF stationary test is used to test the residuals (u_t). The following are the estimated residuals obtained:

$$\Delta u_t = -0.1776\ u_{t-1}\ (-1.884) \quad (8)$$

According to equation (8), H_0 of stationary does not rejected at 5% significance level based on critical value of -3.34. As a result, we do not have sufficient evidence that GDP and political instability exhibit a long run relationship. The residuals are stationary at level and follow by the variables are not cointegrated. Hence, we continue to perform an asymmetric cointegration test to find whether there is a possibility of getting cointegration between the variables by taking into account asymmetric adjustment.

Asymmetric Cointegration Test

Next, this paper estimated the residuals of equation (3) in the form of TAR model using threshold value = 0. As shown in Table 2, ρ_1 = -0.478 and ρ_2 = -0.084 suggest convergence. At 5% significance level, F-statistic is 1.298 which is less than 6.085. Hence, reject null hypothesis of no cointegration. Besides, the threshold value in TAR-consistent is -2.981. At 5% significance level, The H_0 is failed to reject as F-statistic is 2.772. Therefore, cointegration cannot be explained because both TAR model have identical conclusion. MTAR model's results reported in the fourth column of Table 2. The sample value of F-statistic = 2.561 indicates the H_0 cannot be rejected. The convergence for negative than for positive differences from long run equilibrium is proposed by point estimate for ρ_1 and ρ_2. Next, consistent estimate of threshold can be found by employing the Chan's (1993) method. A threshold of -2.407 is found. The point estimates of ρ_1 and ρ_2 shows convergence such that the speed of adjustment is speedier for negative than for positive discrepancies from the value of τ = -2.407.

Table 2: Estimation of TAR and MTAR cointegration

	TAR	TAR-consistent	MTAR	MTAR-consistent
ρ_1	-0.478	-0.494	-0.848	-0.565
ρ_2	-0.084	0.396	-0.134	0.958
γ_1	0.284	0.198	0.425	-0.050
γ_2	0.022	-0.028	0.141	0.137
τ	0	-2.981	0	-2.407
F-stat	1.298	2.772	2.561	10.956**
F-equality	0.754	3.512	3.117	9.877**

Notes: ** 5% significance level

As shown in Table 2, the consistent estimate of the threshold is adopted in MTAR model as below:

$$\Delta\mu_t = -0.565 I_t\, \mu_{t-1} + 0.958(1-I_t)\, \mu_{t-1} - 0.05\, \Delta\, \mu_{t-1} + 0.137 \Delta\, \mu_{t-2} + \varepsilon_t \qquad (9)$$

where

$$Mt = \begin{cases} 1 & if\ \Delta\mu t - 1 \geq -2.407 \\ 0 & if \Delta\, \mu t - 1 < -2.407 \end{cases} \qquad (10)$$

At 5% of significance level, we reject H_0 of no cointegration as the value of F-stat is 10.956. Based on MTAR-consistent model of the F-equality statistic, we found that economic growth and political instability are cointegrated and the adjustment is asymmetric when we reject H_0 at 5% of significance level.

Asymmetric Error-correction Modelling

According to MTAR-consistent model, we obtained the threshold value of -2.407. After that, we proceed to carry out ECM. We applied the maximum lag length of 4 in this study. The positive finding of the cointegration with MTAR adjustment explains the estimation of the following error-correction model.

$$\Delta GDP_t = -0.193 - 0.957 I_t u_{t-1}^{*} - 1.016\, (1-I_t) u_{t-1}^{*} + A_{11}(L)\, \Delta PIt\text{-}1 + A_{12}(L)\, \Delta GDP_{t-1} \qquad (11)$$

$$\Delta PI_t = 0.229 - 0.193 I_t u_{t-1} + 0.035\, (1-I_t) u_{t-1} + A_{21}(L)\, \Delta PIt\text{-}1 + A_{22}(L)\, \Delta GDP_{t-1} \qquad (12)$$

At 10% significance level, we conclude that it is statistically significant in the error correction terms of economic growth. The growth adjusts to negative deviation in the spread at around 0.957.

Conclusion

In a nutshell, political instability is positively related to economic growth in Thailand. It is due to the heart of Thai economy is export, and as long as political instability does not bother much the flow of export, it will influence much on economic growth.

Majority of the studies indicated that economic growth and political instability is symmetrically cointegrated. Keep this in view; this paper aims to investigate asymmetric cointegration through TAR and MTAR methods. Based on the findings, MTAR test can be more powerful than TAR test to show asymmetric cointegration in the case of Thailand.

Acknowledgement

The earlier draft of this paper was presented at the International Conference on Business, Accounting, Finance and Economics (BAFE, 2016) at Universiti Tunku Abdul Rahman, Perak, Malaysia on October 5th, 2016. We would like to show our gratitude to the reviewers for sharing their comments and suggestions given on this paper. Any errors that remain in the paper are of our own responsibility.

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