

Public Debt, Current Account Balance, and Fiscal Balance: The Threshold Effects in Selected ASEAN Countries

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Abstract

Indebtedness is a huge global issue faced by all economies around the world since the older time until today. The high and increasing debt levels have become a concern, and public debt has become the core of the turmoil that began a few years ago. When the government's spending in a year exceeds its revenue, there will be a budget deficit for that fiscal year. Hence, it must use debt to fill the funding gap. This situation creates an annual deficit, which cannot end until the accumulated debt becomes unsustainable and the government's finances collapse. Hence, this study is aimed to assess the impact of the public debt threshold on current account balance and fiscal balance in selected ASEAN countries (Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam) by adopting annual data from 1990 to 2021. In panel long run estimation by pooled mean group (PMG) estimator, public debt affects twin balances to have a positive relationship. In the empirical analysis, the single threshold sample splitting model is employed to assess the impact of the public debt threshold on the current account balance and fiscal balance either below or above the threshold level. The outcomes indicate that the public debt threshold level is at 63.36%. When the public debt threshold is below 63.36%, there is a negative relationship between the current account balance and fiscal balance; whereas when the public debt threshold is higher than 63.36%, there is positive nexus between the current account balance and fiscal balance. This result implies the situation of twin divergence situation when exceeding the public debt threshold level.

Keywords: Current account balance, Fiscal balance, Panel model, Public debt, Threshold effects

1. Introduction

Debt is inevitable and is richly introduced to reduce the negative effect of economic shocks. Since the older time until today, indebtedness is a huge global issue faced by all economies around the world. In the past few decades, the increase in government debt has become a major concern for most countries in the world. Law et al. (2021) revealed that due to stimulus spending and the high cost of stabilizing the financial system, advanced economies are facing a large amount of debt accumulation, especially after the 2007 to 2008 global financial crisis, the European sovereign debt crisis that began in 2008, and the recent outbreak of Covid-19. In the first quarter of 2020, global debt soared to a record high of USD 258 trillion, as the global economy is shut down to contain the coronavirus pandemic and debt levels continued to rise. Although the growth of debt levels is much lower than the average quarterly growth from 2015 to 2019, the global debt accumulation of governments, companies, financial institutions, and households has accelerated.

On the other hand, debt is depicted as a two-edged sword. It can help to enhance better welfare if utilized smartly. On the contrary, overuse can cause serious negative effects. When government spending is exceeding its revenue, there will be a budget deficit for that fiscal year, and hence, borrowing huge funds is needed to overcome the circumstances. Hence, to moderate the passive effects of buffer shocks, a country may accept a deficit situation that is endless until the accumulated debt becomes unsustainable and the government's finances collapse. At the same time, the budget deficit will expand as the debt level grows every year

based on the sum of all preceding debt, interest paid on debt, and the current growth in new debt. The high level of debt will therefore have an impulsive effect on twin balances (current account balance & fiscal balance). Moreover, Cecchetti et al. (2011a) indicate that as debt levels increase, borrowers' repayment ability becomes more sensitive to declines in income and sales and even rises in interest rates. The higher the debt level, the greater the scale of the economic shock. Despite reducing the detrimental effects of temporary economic shocks, public debt is one of the strategies used to finance a country's development, where funds are primarily for country development.

Makin (2005) stated in his research that according to the data of the International Monetary Fund, the public debt-to-income ratio of these ASEAN economies has risen to a higher level than before the Asian financial crisis, exceeding the average public debt and income. The income ratio of advanced economies is about 25%. However, due to various reasons, the level of public debt after the Asian financial crisis has risen sharply. One is the large-scale devaluation of the currency during the crisis, which greatly increased the local currency value of foreign currency debt. The second reason is that in the context of the global economic slowdown, governments of various countries have adopted fiscal policies as countercyclical measures after the crisis to stimulate domestic consumption. Third, the acceleration of internal financial liberalization promoted the issuance of public debt instruments in the local market at that time. A country's high level of public debt will lead to a high fiscal deficit, leading to an increase in the current account deficit.

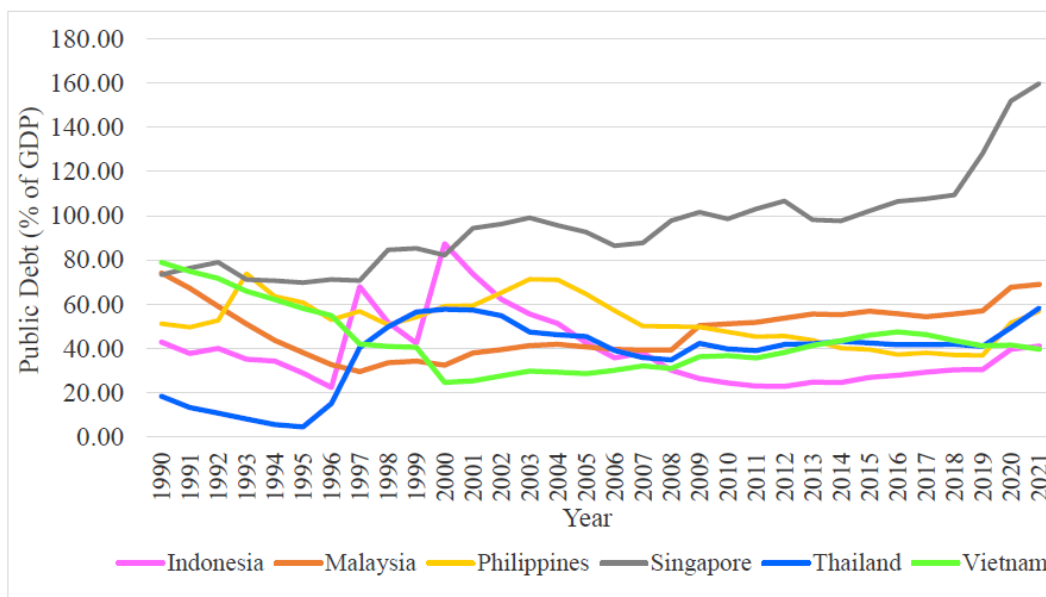


Figure 1. Public Debt in Selected ASEAN Countries, 1990 to 2021

Source: World Economic Outlook Database, IMF (2022)

The selected ASEAN countries have recorded different trends in public debt from 1990 to 2021. Among the 6 ASEAN countries in Figure 1, Singapore demonstrates an increasing

trend in public debt level, whereas the other 5 countries show fluctuation trends throughout the period. By IMF (2022), during the Asian financial crisis in 1997, Malaysia, Singapore, and Thailand reveal a rise in public debt level by 13.50%, 19.58%, and 23.28% of public debt-to-GDP ratio respectively in 1998. Nevertheless, Indonesia, Philippines, and Vietnam gain a decline in public debt by 23.84%, 10.76%, and 2.47% of public debt-to-GDP ratio respectively in 1998. The Philippines fared better during the Asian financial crisis when compared to its neighboring countries because most of the loans went to the country's productive industries, its financial system is stronger, and the availability of credit to companies does not decline as much. Besides, the closer economic link to the U.S. by the Philippines has resulted in strong export growth. The sizable abroad population of the Philippines that sends remittances in foreign currency which exceeds its current interest payments on public debt also help to reduce in public debt level during the Asian financial crisis. Furthermore, in the recovery period of the Asian financial crisis from 1999 to 2000, Malaysia has become one of the region's strongest economies. This is due to the high global demand for electronics and supportive macroeconomics policies introduced. The measures have brought a significant surplus in the current account, later increasing the foreign reserves. In other words, public debt can act as an important macroeconomic indicator in shaping the economic well-being of a country.

On the other hand, Afonso and Opoku (2018) indicated that the current account is one of the core indicators of external imbalances in the global economy. Today, the problems of global imbalances are rising, and the world again exposes to large external imbalances (Das, 2016). The combination of international commerce and financial activities in this globalized decade will offer benefits such as efficient resource allocation that is related to saving and investment. Meantime, Altuzarra et al. (2010) raised that integration will lead to global imbalances in the current account. Practically, global imbalances also refer to huge deficits and surpluses in the global economy's current account positions (Sadiku et al., 2015).

Park and Shin (2009) mentioned that the continuous huge current account surplus is a new norm in ASEAN countries. The current account shows that Malaysia, Thailand, the Philippines, and Singapore have reduced their current account deficits, and these countries have huge public debts. Šŭliková and Tykhonenko (2017) revealed that the driving factor of this phenomenon may be the decline in domestic production and demand. Intentionally, the 6 selected ASEAN countries are chosen to be investigated. Indonesia's current account has experienced a continuous decline since 2000 until it recently experienced a deficit. The main reason is in 2008, the subprime mortgage crisis caused Asian stock markets to fall, and Indonesia's bond spreads are among the best among emerging Asian economies (Guinigundo, 2010). Yet, in 2008, Malaysia acquires a peak current account surplus of 16.52% of GDP, as Malaysia enforces two direct cash injections stimulus packages to comply with the crisis (Athukorala, 2010; Sangakala et al., 2016). In the same year, the Philippines experiences a decline in exports that further leads to devaluation in the Philippines Peso, hence an intense drop in the current account is shown. On the contrary, Singapore always exposes to current account surpluses because it can start a fiscal surplus and develop successfully, attracting many capital inflows. Thailand has great trouble with uncertain political issues which cause

the current account to be deficit until 2014. Nevertheless, the tourism industry is replaying its important role as a development engine to strengthen the economy. Likewise, after the mortgage crisis in 2008, Vietnam continuously gains a current account surplus, where which is reported by the growth of industrial manufacturing production and the success of the free trade agreement to broaden its market scope.

In the developing world, ASEAN is believed to be one of the most prominent intergovernmental organizations. The ASEAN grouping aims to stimulate economic growth and maintain stability among its members. These selected 6 ASEAN countries each have a series of beneficial domestic and international conditions. They have a strong capability to rapidly move upwards on the development ladder to realize their economic visions and they continue to be the primary driving forces for economic growth in the Asia-Pacific region. Meanwhile, ASEAN is a strong regional grouping that helps to eliminate trade barriers between member states to ease the flow of goods and services in the region and to improve economic growth. Whereby, Singapore is the strongest supporter of ASEAN. Singapore works to develop and maintain good ties with other countries through a variety of diplomatic efforts and channels. This plays a greater role in ensuring international trade stability and helps to boost the economy in the ASEAN region.

Currently, there is no policymakers have formulated specific guidelines on what level of government debt should be maintained. The high public debt level that induces fiscal deficits may be harmful to current account balances and expose the country to insolvency, even the risk of bankruptcy (Cheong et al., 2011). Likewise, there is also no study paying attention to the public debt threshold on current account balance and fiscal balance in selected ASEAN countries. Hence, this paper contributes to investigating the relationship between public debt and twin balances. It also assesses the threshold impact of public debt on twin balances in the selected ASEAN countries. This work may significantly contribute to the empirical literature.

2. Literature Review

The theory that is allocated in this research study is The Keynesian Theory of Deficits. Keynesian deficit theory is an economic statement about the total expenditure of the economy, which influences output. The Keynesian theory of absorption has traditionally explained the dual linkages between the fiscal balance and the current account balance (Šŭliková & Tykhonenko, 2017), stating that increases in the fiscal deficit are followed by an increase in the current account deficit. Furthermore, Saleh and Harvie (2005) claimed that the Keynesian absorption hypothesis proposed that increases in the budget deficit would promote domestic absorption, resulting in an increase in imports and a current account deficit in which imports exceed exports. Furthermore, when the budget deficit grows, the government's revenue is likely to fall more than the government's spending. Finally, according to the Keynesian viewpoint, budget deficits cause current account deficits.

Continuously, it is proceeding to the literature review of this research study. Empirical research on the twin balances and debt has traditionally concentrated on whether there is an interrelationship between the twin imbalances and debt. Soo and Kueh (2019) mentioned that debt and fiscal deficit are highly correlated where the magnitude of debt will cause fiscal

deficit to occur. A fast-growing debt requires a huge amount of government expenditure to service such debt. The cyclical relationship between these two items may bring serious economic instability or even cause a national financial crisis, i.e., a current account deficit. Empirical findings provide mixed conclusions on the effect of public debt on twin imbalances.

Gevorkyan (2010) investigated the impact of debt on the twin balances of 12 CIS countries from 1989 to 2008. He summarized that debt service suggested a positive relation between the current account and the fiscal budget. Besides, with the presence of debt in the main model, the current account and fiscal budget produce a statistically more significant positive relationship. Moreover, Nickel and Tudyka (2014), investigated 17 European countries from 1970 to 2010 by utilizing the panel VAR model. They found that twin deficits occurred at low levels of debt, while twin divergence happened at high levels of debt.

Sžliková and Tykhonenko (2017) examined the relationship between public debt and twin deficits in 14 European countries by adopting a panel threshold regression model with yearly frequency from 1995 to 2012. They proposed that when public debt is less than the 40.2% debt threshold, there is significant negative relation. Twin deficits occur between 40.2% and 96.6% of the threshold debt level with a positive relationship, while twin divergence occurs when exceeds 96.6% of the threshold debt.

More recently, Furceri and Zdzienicka (2020) measured 114 developing countries in the world. They used annual data from 1990 to 2015 by adopting the ARDL model. They reported that the influence of fiscal shock on the current account balance is weaker with high public debt. Meanwhile, the study by Okombi (2020) is based on the effect of three different indebtedness (public debt, external debt, and domestic debt) on the current account balance in 30 African countries with a yearly approach from 2004 to 2017 by employing a panel threshold regression. The result findings demonstrated the debt threshold level for public debt, external debt, and domestic debt are 78.4%, 65.25%, and 13.5% respectively. When below the debt thresholds of the three different indebtedness, fiscal balance also has a significantly positive effect on the current account, whereas, beyond the debt threshold, the fiscal balance has an insignificant effect.

Additionally, with the same objectives, Rajakaruna et al. (2021) conducted research on five South Asian countries (Bhutan, Sri Lanka, Maldives, Pakistan, and India) that experienced twin deficits and with high debt-to-GDP ratio from 1980 to 2018 by employing panel threshold model. They found a double threshold model with a debt-to-GDP threshold at 46.21% and 65.80%. The findings concluded that when below the debt threshold of 46.21%, there is a positive significant relationship between twin deficits; whereas in between threshold debt level of 46.21% and 65.80%, it is a negative significant relationship; however, when above the 65.80% debt-to GDP threshold level, twin imbalances relationship is positive significant.

Likewise, there is also a study carried out by Bousnina and Gabsi (2022) on the threshold effect of public debt on twin imbalances in MENA countries (Middles East and North Africa) from 2003 to 2019. They discovered that there is a double threshold model with three debt-to-GDP intervals in the twin relationship, which is at 36.71% and 72.99%. When below

36.71% of the public debt threshold, twin imbalances show negative nexus; while in between the intervals, there are twin deficits; and twin divergence is indicated when the public debt threshold is beyond 72.99%.

Multiples previous studies conclude that once the debt reached a certain threshold level, it would have a different impact on the current account balance and fiscal balance based on the area of study.

3. Data and Methodology

This study utilizes a balanced panel model approach on 6 selected ASEAN countries (Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam) from 1990 to 2021 annually. The dependent variable is current account balance (CAB); independent variables are fiscal balance (FB) and public debt (PD); control variables are real GDP (RGDP), REER, age dependency ratio for old (ADRO), and age dependency ratio for young (ADRY). Data is retrieved from the UNCTAD database, IMF, World Economic Outlook Database, and World Bank, World Development Indicators.

3.1 Data Descriptions

The current account balance is the major guide to an economy's performance that affects the economy and the growth of a country. Besides, the current account also records a nation's transactions with the rest of the world. The current account balance is measured as a percentage of the GDP. Furthermore, Baharumshah et al. (2009) stated that fiscal balance is important as it indicates the long-term economic progress of the nation. The fiscal balance is the net amount between government revenues and government expenditures and is measured as the percentage of GDP. In addition, public debt also known as government debt is defined as the accumulation of the present value of government expenditure and the initial debt level (Barro, 1979). In other words, public debt explains how much a country owes to outside lenders. It is measured as a percentage of the GDP.

3.2 Empirical Model

The basic panel regression model of this study is a linear function. To get the best-fit model, the variables are applied with logarithm form and expressed in the following.

$$LCAB_{it} = \alpha + \beta_1 LFB_{it} + \beta_2 LPD_{it} + \beta_3 LRGDP_{it} + \beta_4 LREER_{it} + \beta_5 LADRO_{it} + \beta_6 LADRY_{it} + \varepsilon_{it} \quad (1)$$

When proceeding to threshold estimation, the idea of Hansen (2000) is applied. The threshold variable is divided into two regimes which are based on the single threshold sample splitting model. Therefore, the perspectives of threshold effects that are either below or above the threshold level are recorded. The threshold sample splitting model for two intervals is tabulated as shown below.

$$LCAB_{it} = \alpha + \beta_1 LFB_{it} + \beta_2 LPD1_{it} + \beta_3 LRGDP_{it} + \beta_4 LREER_{it} + \beta_5 LADRO_{it} + \beta_6 LADRY_{it} + \varepsilon_{it} ; PD1 \leq \gamma \quad (2)$$

$$LCAB_{it} = \alpha + \beta_1 LFB_{it} + \beta_2 LPD2_{it} + \beta_3 LRGDP_{it} + \beta_4 LREER_{it} + \beta_5 LADRO_{it} + \beta_6 LADRY_{it} + \varepsilon_{it} ; PD2 > \gamma \quad (3)$$

Moreover, the threshold sample splitting model for two intervals (Eqn. 2 & Eqn. 3) can be combined and displayed as follows:

$$LCAB_{it} = \alpha + \beta_1 LFB_{it} + \beta_2 LPD1_{it}(PD1 \leq \gamma) + \beta_3 LPD2_{it}(PD2 > \gamma) + \beta_4 LR GDP_{it} + \beta_5 LREER_{it} + \beta_6 LADRO_{it} + \beta_7 LADRY_{it} + \varepsilon_{it} \quad (4)$$

where CAB indicates current account balance (% of GDP); FB denotes fiscal balance (% of GDP); PD1 represents public debt below or equal the threshold level (% of GDP); PD2 implies public debt above the threshold level (% of GDP); RGDP expresses real GDP (constant USD); REER shows the real effective exchange rate (constant USD); ADRO demonstrates age dependency ratio for old (% of working-age population); and ADRY signifies age dependency ratio for young (% of working-age population).

3.3 Methodology

3.3.1 Panel Unit Root Tests

Panel unit root test is applied to examine the stationarity of a process that will change according to time. When investigating variables to discover their validity for the normative assumptions of asymptomatic analysis, a stationarity test is necessary. The panel unit root tests employed are Levin et al. (2002) and Im et al. (2003). The stationarity variables will occur at the first difference, $I(1)$. The hypothesis rule for panel unit root tests is shown below. The rejection rule for the tests is t-stat larger than the significance value, H_0 is rejected, and vice versa.

H_0 : Unit root exists (non-stationary)

H_a : No unit root (stationary)

3.3.2 Panel Cointegration Tests

The cointegration test is mainly used to study the long-term equilibrium relationship between variables. The cointegration test is an expression of the feasibility of the cointegration vector, and the coefficient can be directly interpreted as a long-term equilibrium. In Pedroni (1999) test, the cointegration of variables is determined by the significant or insignificant denominations variable. Pedroni (1999) and Kao (1999) were used in this study.

3.3.3 Panel Long Run Estimation

In the panel long run estimation of this study, the pooled mean group (PMG) estimator is proposed to be employed. According to Bangake and Eggoh (2012), the Hausman test is first used to differentiate between the mean group (MG) and PMG estimators to evaluate the null hypothesis of homogeneity. PMG is introduced by Pesaran et al. (1999) to examine the non-stationary dynamic panels with heterogeneous across units. It is adopted in this study to act as a long run estimator. The coefficient in PMG is being pooled and averaged. The grouping of individual groups imposes long-term limitations, but the PMG estimator makes short-term responses flexible and uncontrolled across categories. In other words, the adjustment between the short run and long run is emphasized by PMG, which preserves the long run coefficients while allowing the intercept, error variance, and short run coefficients to vary freely between groups (Bangake & Eggoh, 2012).

3.3.4 Threshold Estimation

According to Šŭliková and Tykhonenko (2017), Hansen (1999) described a balanced panel data threshold model in that the estimation of the threshold variable determines the different "schemes" of the relationship among the endogenous variable and the exogenous variables. The threshold model solved the issue of estimating the regression function within dependent and independent variables that are not the same throughout the data sample but can be divided into several subsamples. The panel threshold model proposed by Hansen (2000) is employed. Hansen (2000) developed a statistical principle for threshold estimation in regression, where the least squares estimation of the regression parameters is considered. The sample pattern of the threshold regression model is as follows.

$$y_i = \theta'_1 x_i + e_i, q_i \leq \gamma; \quad y_i = \theta'_2 x_i + e_i, q_i > \gamma$$

where y_i and q_i are real-valued and x_i is an m -vector. Besides, q_i is a threshold variable, and it is inferred to have a continuous distribution.

4. Empirical Findings and Results Analysis

4.1 Panel Unit Root Tests

In panel model analysis, it is important to make sure the stationarity of variables is in the same order for further identification to perform cointegrating testing. Table 1 tabulates the unit root test results based on Levin et al. (2002) and Im et al. (2003). Based on the outcomes, LCAB and LFB are integrated in level form, whereas LPD and LRGDP are integrated in the first difference. However, mixed results are obtained for LREER, LADRO, and LADRY. This indicates that variables are either stationary at level, $I(0)$ or first difference, $I(1)$, and thus the cointegration test can be performed to further examine the existence of a long run relationship between variables.

Table 1. Levin et al. (2002) and Im et al. (2003) Panel Unit Root Tests Results

Test Statistics				
	LLC	IPS	LLC	IPS
	Individual Intercept		Individual Intercept and Trend	
Level				
LCAB	-3.4549 (0.0003)*	-3.3732 (0.0004)*	-3.0271 (0.0012)*	-1.9730 (0.0242)*
LFB	-2.2165 (0.0133)*	-3.4614 (0.0003)*	-1.7831 (0.0373)*	-2.8561 (0.0021)*
LPD	-0.1276 (0.4519)	0.0018 (0.5007)	-1.4313 (0.0762)	-1.1682 (0.1214)
LRGDP	-0.9036 (0.1831)	1.7548 (0.9604)	0.6934 (0.7560)	-0.0444 (0.4832)
LREER	-1.4115 (0.0790)*	-0.7834 (0.2167)	0.4355 (0.6684)	0.0879 (0.5350)
LADRO	0.7858 (0.0840)*	3.6488 (0.9999)	-0.3757 (0.3536)	3.1993 (0.9993)
LADRY	-4.2803 (0.0000)*	-0.8080 (0.2095)	0.6206 (0.7326)	0.7208 (0.7645)
First Difference				
Δ LCAB	-9.7012 (0.0000)*	-10.4021 (0.0000)*	-8.6080 (0.0000)*	-9.5288 (0.0000)*
Δ LFB	-14.4626 (0.0000)*	-13.4931 (0.0000)*	-13.1932 (0.0000)*	-12.3842 (0.0000)*
Δ LPD	-5.4992 (0.0000)*	-6.0043 (0.0000)*	-4.7633 (0.0000)*	-5.1981 (0.0000)*
Δ LRGDP	-9.2249 (0.0000)*	-9.6578 (0.0000)*	-8.2364 (0.0000)*	-8.1785 (0.0000)*
Δ LREER	-6.1511 (0.0000)*	-7.8510 (0.0000)*	-4.8267 (0.0000)*	-6.1673 (0.0000)*
Δ LADRO	3.0530 (0.0989)*	4.5984 (1.0000)	0.1310 (0.5521)	1.7161 (0.0569)*
Δ LADRY	0.8814 (0.8110)	1.4017 (0.9195)	-0.5814 (0.0805)*	1.2719 (0.8983)

Notes: LLC indicated Levin et al. (2002) and IPS indicated Im et al. (2003) panel unit root and stationary tests. The LLC and IPS examine the null hypothesis of non-stationary variables. The parenthesized values are the probability of rejection. Asterisks (*) indicate statistically significant at a 10 percent level.

4.2 Panel Cointegration Tests

Pedroni (1999, 2001, 2004) and Kao (1999) cointegration tests are employed to test the long run cointegration within the variables in the model. Table 2 shows the cointegration tests result. The results of the Pedroni cointegration test demonstrate that there are four out of seven major statistics, which indicates most of the statistics have sufficient evidence to reject the null hypothesis with no cointegration existing. Meanwhile, in Kao (1999) cointegration test, the probability value is smaller than the significant level at 10%, meaning that the rejection of the null hypothesis with no cointegration is accepted. In other words, all variables are cointegrated in the long run.

Table 2. Panel Cointegration Tests Results

A: Pedroni Residual Cointegration Test	
Panel cointegration statistics (within-dimension)	
Panel <i>v</i> -statistics	-1.8798(0.9699)
Panel <i>rho</i> -statistics	2.8971(0.9981)
Panel <i>PP</i> -statistics	-0.2923(0.0850)*
Panel <i>ADF</i> -statistics	-0.7864(0.0158)*
Group mean panel cointegration statistics (between-dimension)	
Panel <i>rho</i> -statistics	3.2072(0.9993)
Panel <i>PP</i> -statistics	-2.8063(0.0025)*
Panel <i>ADF</i> -statistics	-1.4242(0.0772)*
B. Kao Residual Cointegration Test	
ADF	-3.1043(0.0010)*

Notes: The number of lags used in the calculation of the seven Pedroni statistics is 5 while the Kao ADF statistic is 8. The parenthesized values are the probability of rejection. Asterisks (*) indicate statistically significant at a 10 percent level.

4.3 Panel Long Run Estimation

Based on the Hausman test result tabulated in Table 3, the *p*-value is 0.9483, which is insignificant to 5% of the significance level. Therefore, the H_0 for the Hausman test cannot be rejected, which supports the PMG estimator in fulfilling the long run estimation. According to the findings of PMG estimation in Table 3, LFB brings effect to the relationship between current account balance and fiscal balance, where they show a positive and statistically significant relationship in the model. Meanwhile, when there is a 1% rise in LFB, indicates the LCAB to increase by 0.085%. This outcome is consistent with the studies by Gevorkyan (2010), Nickel and Tudyka (2014), Coban and Balikcioglu (2016), and Furceri and Zdzienicka (2020).

Table 3. Hausman Test and Pooled Mean Group (PMG) Estimation Result

PMG Estimation	
LFB	0.0854(0.0493)*
LPD	0.4092(0.0003)*
LREER	-0.5636(0.0047)*
LRGDP	0.1253(0.0633)*
LADRO	-1.1364(0.0584)*
LADRY	-0.2553(0.5931)
Speed of adjustment	
ECT	-0.3730(0.0000)*
Hausman Test	
Chi-square statistics	1.6600
<i>p</i> -value	0.9483

Notes: In PMG estimations, it is estimated using ARDL (2,2) specification. The asterisks (*) in PMG estimation indicate statistically significant at a 10% level; while in the Hausman test, if the *p*-value is greater than a 5% significance level (0.05), do not reject H_0 .

4.4 Threshold Estimation

The threshold regression approach is employed to estimate the impact of public debt on twin imbalances with the evidence of long run relationship between variables. Based on the idea of Hansen (2000) that developed a statistical principle for threshold estimation in the regression, STATA software is employed to carry out the threshold estimation.

Primarily, to fit the single threshold model, with the $H_0: \beta_1 = \beta_2$ (no threshold effect or linear model), and $H_a: \beta_1 \neq \beta_2$ (threshold effect exists or non-linear model), a threshold estimator model test is carried out. Results in Table 4 indicate the estimator of the single threshold model is 4.8770% with a 90% confidence interval [4.8728; 4.8838]. This outcome induces that F-stat is significant, hence H_0 will be rejected, and later proceed to the threshold effect test.

Table 4. Threshold Estimator in Single Threshold Model

Model	Threshold	Lower	Upper
Th-1	4.8770	4.8728	4.8838

Note: Threshold estimator (level=90).

Source: Stata's estimation.

Next, proceed to the threshold effect test on the threshold model to verify the application of a single threshold model. Moreover, to estimate the single threshold effect, a 300-bootstrap replication is employed. The bootstrap estimator that was introduced by Tang and Chen (2009) is adopted to reduce the estimation bias substantially (Guo, 2020).

Firstly, this study undergoes multiple threshold effect tests by utilizing the idea of Wang (2015). The threshold effect outcomes show that the *p*-values in the double threshold test and triple threshold test are insignificant. This implies the application of a single threshold model.

The hypothesis test for the single threshold effect test is H_0 : with the linear model and H_a : with the single threshold model. By referring to Table 5, F-stat for the threshold effect in the single threshold model is 11.46, which is larger than the critical value at the 10% significance level, which demonstrates a significant. Besides, it is also significant with a bootstrap p -value of 0.0000. Therefore, H_0 is rejected. In other words, the relationship between public debt and the twin balances is non-linear and there is an existence of the single threshold effect.

Table 5. Threshold Effect in Single Threshold Model

Threshold	F-stat	Prob
Single	11.46	0.0000*

Note: The threshold effect test with bootstrap is 300.

Source: Stata's estimation

Since this study, it is a single threshold model, hence, the public debt distributes the relationship among twin imbalances into two intervals: (i) the public debt-to-GDP ratio is lower or equal to 63.36%, (ii) the public debt-to-GDP ratio is higher than 63.36% (refer Equation (2) and Equation (3)). Moreover, Table 6 indicates the results of the association between public debt and twin imbalances of selected 6 ASEAN countries with threshold perspectives.

First, when the public debt-to-GDP ratio is lower or equal to 63.36%, a significant but negative relation between the twin imbalances is performed. In other words, it is in a twin divergence situation. When there is a rise in fiscal deficit is followed by a rise in the current account surplus. Apart from that, this result is opposed to the Keynesian theory of deficits which proposed that fiscal deficit leads to current account deficit. Secondly, when the public debt-to-GDP ratio is higher than 63.36%, the twin imbalances indicate a significant and positive relationship and there are twin deficits or twin surpluses situation. Likewise, a 1% increase in the fiscal deficit will induce 0.0038% growth in the current account deficit and vice versa. This outcome corresponds to the Keynesian theory of deficits. Likewise, the result is consistent with the finding from the study of Šŭliková and Tykhonenko (2017) and Bousnina and Gabsi (2022). Although they found a double threshold model, their study also indicated the same results where twin divergence is observed when the debt is below the threshold level. Nevertheless, this result is inconsistent with the findings from Nickel and Tudyka (2014), Kueh et al. (2017), Okombi (2020), and Rajakaruna et al. (2021), where they found a positive relationship when debt is below a threshold level.

Table 6. Threshold Regression Results – Public Debt as Threshold Indicator

	Public Debt Threshold	
	Below $q \leq 63.36$	Above $q > 63.36$
LFB	-0.6473* (0.2260)	0.0038* (0.0191)
LRGDP	0.0739* (0.0222)	0.0080 (0.0225)
LREER	-1.7546* (0.3875)	-0.2533* (0.0829)
LADRO	0.6860 (0.8025)	-1.7269* (0.2724)
LADRY	2.0075 (0.3099)*	-1.1513* (0.0707)
Observations	36	156
R-squared	0.6939	0.6229

Notes: Dependent variable: Current account balance (% of GDP). Asterisks (*) indicate 10% of the significant level. Values in parentheses denote standard errors.

5. Conclusion and Recommendation

The main objective of this study is to assess the impact of the public debt threshold on current account balance and fiscal balance in selected ASEAN countries from 1990 to 2021 annually. The dependent variable is current account balance; independent variables are fiscal balance and public debt; control variables are REER, real GDP, age dependency ratio for old, and age dependency ratio for young. The related tests are panel unit root tests and panel cointegration tests. The main estimation that is being employed is the panel single threshold sample splitting model. The result of panel long run estimation indicates that public debt affects the twin balances to have a positive significant relationship by using the PMG estimator.

The major finding indicates that the threshold public debt-to-GDP for estimation is 63.36%. Based on the estimation result in this study, the threshold model is a single threshold model. Hence, the public debt distributes the relationship among twin imbalances into two intervals: (i) the public debt-to-GDP ratio is lower or equal to 63.36%, (ii) the public debt-to-GDP ratio is higher than 63.36%. When the public debt-to-GDP ratio is lower or equal to 63.36%, a significant but negative relation between the twin imbalances is performed. In other words, it is in twin divergence which is against the Keynesian Theory of Deficits. Meanwhile, when the public debt-to-GDP ratio is higher than 63.36%, the twin imbalances indicate a significant and positive relationship and there are twin deficits or twin surpluses phenomena that follow the concept of Keynesian Theory of Deficits. Additionally, the estimated result is consistent with studies by Šŭliková and Tykhonenko (2017) and Bousnina and Gabsi (2022) when the debt-to-GDP ratio is below a threshold level. Public debt plays a very important role in influencing global issues, where substitutes from overseas on borrowing are needed for a country to reduce severe negative consequences caused by the economic shock.

In terms of policy perspectives, the economic uncertainty of this era makes debt accumulation inevitable. Yet, managing the optimal debt situation is important for selected ASEAN countries to overcome the uncertainty of the external economy. Brissimis et al. (2012) also implied that acting on only one side is not enough to reflect the sustainability of the current account balance. According to Margit (2012), applying fiscal consolidation can help to moderate and stabilize the debt until it is long-lasting. Furthermore, Cecchetti et al. (2011b) also recommend that governments should further reduce their direct subsidies and

preferential treatment of debt, to cut down high public debt levels.

Furthermore, governments with full solvency and high debt may determine a restrictive fiscal policy, to cut reduce the sudden variances in investor sentiment that can drive the current account of a country to a poor balance (Panizza & Presbitero, 2013). In this regard, the quality of debt has become a key issue, and the purpose of debt accumulation must be compensated with favorable returns in the future. If the debt obtained is used to pay the interest on the initial debt, it will harm the country's prospects. Therefore, maintaining the optimal debt level to overcome the double deficit problem is a huge challenge. It is possible to control and maintain a country's public debt, thereby ensuring the long-term sustainability of a country's fiscal balance and current account balance. Whereby, the great solution may be to raise and expand the level of savings of countries.

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