



DOES THE GLOBAL CRISIS AFFECT THE RELATIONSHIP BETWEEN EXTERNAL DEBT AND ECONOMIC GROWTH? A LINEAR AND NONLINEAR ANALYSIS

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ABSTRACT

The analysis will analyze impact on economic growth of external debt: linear and nonlinear effects of external debt. This sample covers 7 asean countries in the period 2002-2021. In terms of estimation method, in this study we use GMM (generalized method of moments) to estimate that external debt influences economic growth, and we use threshold effects to estimate the threshold value of external debt in that impact. Moreover, the bayesian technique is used to verify the robustness of the estimation outcomes. Estimates of existing models can confirm that external debt considerably affects economic growth, and this effect can be linear or nonlinear. Especially, it indicates more clearly and significantly different relationship between external debt and economic growth in times of global crisis, a particular finding of this study compared with prior studies. To the best of the author's knowledge, this is one of the early research projects on linear and nonlinear effect external debt takes on economic growth during periods of global crisis. Based on the intriguing findings of this study, the asean nations may adopt the necessary policies to develop external debt to enhance economic growth

Keywords: ASEAN, economic growth, external debt, global crisis

1. INTRODUCTION

External debt means the aggregate of obligation for the people being 'indebted' in a country towards the people outside that territory, including both principal (IMF, 2013) and interest (IMF, 2013). They can, therefore, be individuals, firms, or some other legal entity in the economy. One of the theoretical perspectives related with external debt and its relationship with economic growth is its strong theoretical basis and there is considerable empirical research in this area as well. The bulk of previous research discusses the linear relationships of external debt with growth (e.g., Kenen, 1990; Sachs, 1990; Fosu, 1999; Iyoha, 1999; Clements et al., 2003; Choong et al., 2010; Daud & Podivinsky, 2012; Siddique et al., 2016; Ehikioya et al., 2020). Yet, a considerable body of work argues that this relationship is nonlinear (cf. Cohen, 1997; Clements et al., 2003; Cordella et al., 2010; Dauda et al., 2013), albeit with markedly different thresholds for external debt recognized across studies (cf. Daud & Podivinsky, 2012).

This disparity is not surprising, as the growth implications are dependent on both the quantity and quality of external debt as well as country attributes. Therefore, it is necessary for creating empirical evidence suited to each country or region that has relatively similar features in order to help create effective debt management policies. The defining level of external economic debt is vital. External debt supports economic growth when debt is sustainable and utilised efficiently (Ijirshar et al., 2016; Mariano & Villanueva, 2006; Ndubuisi, 2017; Jemmali et al., 2026; Pamucar et al., 2026). Contrariwise, over-leverage or poorly managed debt is detrimental to growth performance (Adegbite et al., 2008; Clements et al., 2003; Cohen, 1997; Cordella et al., 2010; Pattillo et al., 2004). This indicates that there is a critical debt threshold above which the effect of external debt changes from positive to negative. Although several studies have attempted to find such thresholds, there is no consensus. Cohen (1997) describes a debt to GDP threshold of 50% for Latin America and Africa, for example, whilst Clements et al. (2003) estimate 25% for low-income countries. Cordella et al. (2010) proposed 79–80% range whereas Dauda et al. (2013), on the other hand, find a much lower threshold for Malaysia, on the order of around 17% of GDP. These disparities highlight the need for regional analysis. External borrowing – In practice, external debt is the most common problem for countries across the globe in times of global crisis. It is well documented that governments frequently turn to outside borrowing for financing stimulus measures and to normalize the financial system, as witnessed during the 2007–2008 worldwide financial crisis, 2009–2012 Eurozone debt crisis and 2020–2021 COVID-19 pandemic (DeLong & Summers, 2012; Law et al., 2021). The relationship of the two is not only theoretical, but also economic. While external debt is a policy instrument to dampen economic downturns, poor debt utilization causes recessions instead of their amelioration (Kamin et al., 1989; Kenen, 1990; Sachs, 1990; Drakul, 2025). Consequently, such external debt may accentuate the effects of external debt on economic growth during global crises. Yet this issue has been little considered in literature and constitutes an identified research gap. In the case of ASEAN countries, this is especially apparent. Most of the economies in this region are either developing or emerging and hence external capital flows, particularly external debt, are very important in meeting investment and development requirements. During this period the growth effects and threshold ratios of external borrowing in the ASEAN region are likely to differ significantly from other countries. Therefore, there is a need for empirical evidence relevant to ASEAN countries to guide the adaptation of appropriate debt policy instruments to foster sustainable growth. The study also adds to studies in several different directions. First, in fact, it offers empirical evidence to show not only that external debt influences economic growth in ASEAN countries, but also nonlinear as well, providing a more comprehensive perspective than that found from studies which concentrate only on those kinds of phenomena. Second, it examines these effects in times of global crisis, taking up a dimension which has received little empirical attention despite its policy significance. Third, the study includes the GMM combined with Bayesian methods to test the robustness making the findings trustworthy and interpretable. The results resonate especially with ASEAN policymakers. The data shows that external debt exhibit substantial linear and nonlinear associations with growth and grow larger during international crises. This indicates the potential for external shocks to exaggerate the impact of debt on growth. ASEAN countries will have to manage external debt levels prudently in addition to accompanying policies that improve debt efficiency and withstand external shocks. The rest of this is organized as follows. Section 2 reviews the literature and constructs the research hypotheses. The methodology as well as the data are described in Section 3. The empirical results are presented and discussed in Section 4. Finally, the section ends and describes policy implications.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The interrelationship of external debt and economic growth can be addressed through different economic growth perspectives such as classical growth theory (Ricardo, 2015), neoclassical growth theory (Diamond, 1965; Solow, 1956; Matthew & Mordecai, 2016), and endogenous growth theory (Romer, 1990). Within these frameworks, capital as well as labor, and technology is established as the important factor behind economic growth (Adegbite & Ayadi, 2011). Here, external debt acts as an important source of capital in countries without national savings. Yet their effects on growth can be non-linear, a notion most likely accounted for by the Laffer curve theory of external debt (Sachs, 1990), which posits that negative or diminishing effects beyond certain debt rates are expected. Domestic constraints on capital led many countries to attract foreign capital in the form of external borrowing. The growth implications of the external debt have therefore received considerable attention from various regions (Bal & Rath, 2014; Panizza & Presbitero, 2014). A large part of the empirical literature finds a clear linear relationship between external debt and economic growth (Choong et al., 2010; Clements et al., 2003; Daud & Podivinsky, 2012; Ehikioya et al., 2020; Fosu, 1999; Iyoha, 1999; Kenen, 1990; Sachs, 1990; Siddique et al., 2016; Gulvira et al., 2024). On the other hand, other studies found nonlinear effects, indicating an effect size dependent impact of external debt (Cohen, 1997; Clements et al., 2003; Cordella et al., 2010; Dauda et al., 2013). Nonetheless, empirical evidence is mixed, and the degree and way external debt affects economic growth are not well defined (Pattillo et al., 2004).

2. 1. EMPIRICAL STUDIES ON THE LINEAR IMPACT OF EXTERNAL DEBT ON ECONOMIC GROWTH

A substantial body of empirical literature confirms the existence of a linear relationship between external debt and economic growth. However, these studies do not reach a consensus regarding the magnitude or direction of this effect.

2. 1. 1. POSITIVE EFFECTS OF EXTERNAL DEBT ON ECONOMIC GROWTH

External debt can serve as an important source of capital that supports economic growth, particularly in developing and emerging economies where domestic savings are often insufficient. Limited revenue bases combined with rising expenditure needs increase reliance on foreign capital, especially external borrowing (Makun, 2021). External debt enables governments to finance growth-oriented policies, mitigate economic downturns during periods of global crisis, and stabilize macroeconomic conditions (DeLong & Summers, 2012; Law et al., 2021). When used effectively, borrowed funds can support domestic investment and infrastructure development, stimulate private sector participation, and enhance productive capacity (Ijirshar et al., 2016; Ndubuisi, 2017). In addition, external debt may contribute to growth by stimulating domestic consumption and aggregate demand (Mariano & Villanueva, 2006).

2. 1. 2. NEGATIVE EFFECTS OF EXTERNAL DEBT ON ECONOMIC GROWTH

Conversely, external debt can hinder economic growth when it is excessive or poorly managed. First, rising debt levels may reduce the efficiency of capital allocation, thereby constraining growth potential (Fosu, 1999). Second, growing debt-servicing obligations can divert public resources away from productive investment, crowd out private sector activity, and weaken long-term growth prospects (Hofman & Reisen, 1991; Jayaraman & Lau, 2009; Cohen, 1993; Hansen, 2004; Presbitero, 2006). Numerous empirical studies support these adverse effects. Kenen (1990) and Sachs (1990) argue that sustained high external debt has constrained growth and, in some cases, triggered economic recessions. Fosu (1999) finds that many sub-Saharan

African economies could achieve higher growth in the absence of external debt, while [Iyoha \(1999\)](#) shows that debt reduces growth primarily through its negative impact on investment. Similarly, [Clements et al. \(2003\)](#), using data from 55 low-income countries, report that ineffective debt management increases fiscal deficits, lowers public savings, discourages private investment, and reduces spending on infrastructure and human capital. Comparable findings are reported by [Daud and Podivinsky \(2012\)](#) for developing countries and by [Siddique et al. \(2016\)](#) for low-income economies.

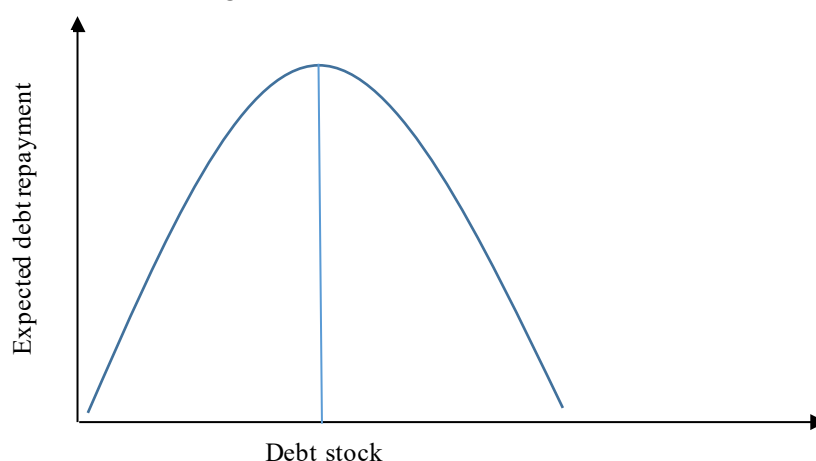
Further evidence suggests that the negative effects of external debt may vary over time. [Ehikioya et al. \(2020\)](#) document a short-term negative impact of external debt on economic growth in Africa, while emphasizing that improved monitoring and efficient use of borrowed funds can generate positive long-term outcomes. At the country level, [Choong et al. \(2010\)](#) find that external debt negatively affects economic growth in both the short and long run in Malaysia.

2. 2. EMPIRICAL STUDIES ON THE NONLINEAR IMPACT OF EXTERNAL DEBT ON ECONOMIC GROWTH

Capital is identified as an essential driver of economic growth as a core pillar in economic growth theories. Countries regularly draw on external capital inflows, especially external debt, to help boost growth, alongside domestic savings.

The Laffer curve theory of external debt further accounts for the nonlinear relation between external debt and economic growth (see Figure 1). Originally proposed by [Sachs \(1990\)](#) in the context of developing economies, this concept suggests that while external borrowing can provide resources in support of progress, once such borrowing exceeds a certain extent it becomes counterproductive for growth. When external debt is kept within limits that are sustainable, it can even promote growth by offering productive capital to be invested in. However, once debt exceeds a critical level, it may weaken the capacity to repay debts and constrain economic performance. High levels of debt can crowd out domestic investment as governments divert resources towards servicing debt. In addition, high debt can mean lower expected investment returns and hence tax hikes or fiscal adjustments as governments are forced to repay their debt obligations, and that dissuades private investment.

Figure 1. Laffer curve of external debt

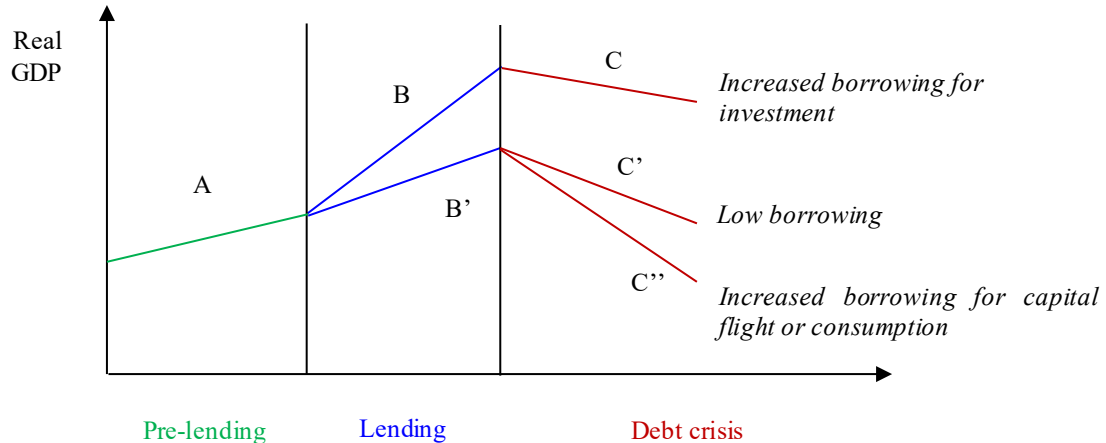


Source: [Pattillo et al. \(2004\)](#), [Osinubi et al. \(2010\)](#)

In developing and emerging economies, external debt is of crucial importance in fostering economic growth ([Makun, 2021](#)). On the flip side, when external debt uses and/or borrowed money exceed an optimal limit, we can see that the external borrowing is likely to constrain

growth, as opposed to stimulating it (Cohen, 1993; Fosu, 1999; Hansen, 2004; Presbitero, 2006). Accordingly, the determination of the suitable external debt level that favors economic growth has received significant interest from policymakers and scholars. To be aware of this phenomenon, many empirical studies have attempted to find thresholds beyond which the impact of external debts on economic growth shifts, suggesting a non-linear interaction. From this viewpoint, Kamin et al. (1989) argue that external debt can boost economic growth over time only when it is confined to the sustainable bounds, which is most evident in the accumulation of capital. But as debt reaches a serious threshold, the effect becomes negative. The external debt-economic growth relationship is determined by three primary transmission channels: (i) Investment, (ii) Aggregate demand and (iii) Debt repayment obligation. By the investment channel, countries help to reduce capital limitation by having access to international credit markets. If borrowed funds are deployed wisely, according to part B of Figure 2, an economy's growth might surpass the pre-debt level. Excess or badly administered borrowing is the alternative to this, increasing debt service pressures and macroeconomic instability, and lowering investment and slowing growth as seen in part C of Figure 2. External debt financing higher public and private spending is financed through the aggregate demand channel, which drives up aggregate demand and output, and thus, growth (part B' of Figure 2). Yet a substandard usage of funds borrowed could weaken purchasing demand and slow growth (part C'' of Figure 2). Lastly, the debt repayment obligation channel emphasizes the intertemporal trade-offs of external borrowing. Though growth (in part B' of Figure 2) can be catalyzed by capital accumulation initially, it increases the future repayment liabilities; principal and interest – thus leading to pressure on foreign exchange earnings. But this weight may crowd out investment, and eventually be a damper on economic growth (part C' of Figure 2).

Figure 2. Transmission channels of external debt to economic growth



Source: Kamin et al. (1989)

A few empirical studies also confirm the nonlinear relationship of external debt to economic growth. More precisely, Cohen (1997) is among the first studies to investigate the nonlinear effect of external debt on economic growth in countries of Latin America and Africa. If external debt relative to GDP exceeds the threshold value of 50%, external debt will be a negative influence on investment, which in turn obstructs economic growth as determined by this study. In a second study, Clements et al. (2003) propose that a threshold value for external debt to GDP exceeding 25% can be an obstacle to growth in 55 low-income countries. Adegbite et al. (2008) apply neoclassical growth theory to examine the effects of external debt on growth in Nigeria's economy. Results of this research show that if the external debt is kept within a certain level, external debt plays a substantial role in promoting economic growth. Externally

borrowed money will block investment in the country, increase the liabilities attached by the country to foreign governments and eventually become a negative weight for the national economy. Cordella et al. (2010) unearths a nonlinear effect of external debt on economic growth among developing countries. This is how external debt can promote economic growth if it lies in the range of 15% - 30%, but if external debt relative to GDP falls in the range of 79% - 80%, it becomes detrimental to economic growth. Another study, from Dauda et al. (2013), indicates that nonlinear (inverted U-shaped) effect of external debt on economic growth in Malaysia and the threshold value of external debt is 170.757 million Malaysian Ringgit (about 17% of GDP). The effects of external debt on economic growth also differ, depending on external debt. This in turn suggests that external debt can act at a nonlinear level in terms of influencing economic growth. And the determination of the threshold value of external debt is a concept that has attracted much fanfare from managers and scholars. But there are many conflicting perspectives on how to measure the threshold value of external debt. Thus, the threshold value of the external debt might vary depending on the estimation techniques used and sample of related research data. Hence it is particularly required to predict the threshold value of external debt for regions with like attributes.

2. 3. HYPOTHESIS DEVELOPMENT

2. 3. 1. HYPOTHESES ABOUT THE LINEAR IMPACT OF EXTERNAL DEBT ON ECONOMIC GROWTH:

These empirical studies are still highly contradictory about this as they consider several levels of external debt, particularly the effect of external debt on economic growth. Specifically, external debt hinders economic growth for two reasons: (i) increase of external debt without proper management decreases the efficiency of capital use and reduces the likelihood of economic growth (Fosu, 1999); (ii) an increase of external debt makes countries undergo debt repayment pressure, even reducing resources due to the repayment of debts, which decreases the private investment in the country (Hofman & Reisen, 1991; Jayaraman & Lau, 2009) and impedes economic growth (Cohen, 1993; Hansen, 2004; Presbitero, 2006). The negative effect of external debt on economic growth has seen some empirical research such as: Sachs (1990), Kenen (1990), Fosu (1999), Iyoha (1999), Clements et al. (2003), Choong et al. (2010), Daud and Podivinsky (2012), Siddique et al. (2016), Ehikioya et al. (2020). On this basis, the first research hypothesis is proposed by the author as follows:

Hypothesis H_{1a} : External debt has a negative impact on economic growth.

External debt is an important fiscal resource during the time of global crisis that the world's countries can use to use that financial resource to introduce policies to encourage the growth of economy that helps the level of economic recession particularly reducing (DeLong & Summers, 2012; Law et al., 2021). Moreover, debt in the outside can be a key driver of economic growth as it can create domestic demand on behalf of consumer (Mariano & Villanueva, 2006), it does so by stimulating domestic consumption and encouraging financial injections at the private sector for domestic investment and infrastructure development, such as the involvement of the private sector (Ijirshar et al., 2016; Ndubuisi, 2017). Thus, the author poses a research hypothesis concerning the relationship between external debt and economic growth in times of global crisis:

Hypothesis H_{1b} : During the periods of global crisis, external debt has a positive impact on economic growth.

2. 3. 2. HYPOTHESES ABOUT THE NONLINEAR IMPACT OF EXTERNAL DEBT ON ECONOMIC GROWTH:

From previous research results, it has been shown that how external debt affects economic growth varies depending on the level of external debt. External debt kept within a certain limit can enhance economic growth. However, mounting external debt will reduce investment, build up the burden on a country, and slow the rate of economic growth (Adegbite et al., 2008; Clements et al., 2003; Cohen, 1997; Cordella et al., 2010; Dauda et al., 2013; Pattillo et al., 2004). In other words, there may be a threshold value of external debt; before and after this threshold value, the impact of external debt on economic growth may change. On this foundation, the author presents the following research hypothesis:

Hypothesis H_{2a} : There is a threshold value of external debt; before and after this threshold value, the impact of external debt on economic growth may change.

External debt is an important source of capital that contributes to promoting economic growth in many countries, especially in countries with a lack of capital such as developing and emerging countries. The reality, however, indicates they often face capital shortages while revenue sources are quite limited and expenditure demands increase, leading to increased dependence on foreign capital, especially external debt (Makun, 2021). In general, external debt is an important financial resource for countries to implement policies to promote economic growth, particularly reducing the level of economic recession during periods of global crisis (DeLong & Summers, 2012; Law et al., 2021). Based on the above, if external debt is maintained within a certain limit, it can promote economic growth, and this impact can be suitable for both periods of global crisis and periods without global crisis. From this, the author proposes the following research hypothesis:

Hypothesis H_{2b} : Before the threshold value of external debt, external debt has a positive impact on economic growth.

When external debt rises, countries are compelled to increase debt repayment obligations, which will reduce resources spent to cover the debt, decrease private sector investment (Hofman & Reisen, 1991; Jayaraman & Lau, 2009), and slow economic growth (Cohen, 1993; Hansen, 2004; Presbitero, 2006). So, beyond the threshold value of external debt, external debt can negatively affect economic growth, and in global crisis, the effect can be even more severe. The final research hypothesis proposed by the author is as follows:

Hypothesis H_{2c} : After the threshold value of external debt, external debt has a negative impact on economic growth.

Reality indicates that the impact of external debt on economic growth can become more dramatic during the periods of global crisis. External debt is an important financial resource enabling countries to implement policies to promote economic growth and even reduce the level of economic recession during the periods of global crisis when external debt is maintained within an appropriate range (DeLong & Summers, 2012; Law et al., 2021). However, external debt can increase the level of economic recession (Kamin et al., 1989; Kenen, 1990; Sachs, 1990) when external debt exceeds the threshold value. Notwithstanding, empirical studies have not yet clarified the impact of external debt on economic growth during the periods of global crisis. To fill this gap, in addition to testing hypotheses during the entire research period, the author also tested these hypotheses during the periods of global crisis.

3. ESTIMATION METHOD AND DATA

3. 1. ESTIMATION METHOD

The linear impact of external debt on economic growth has been confirmed in a large number of empirical studies, such as: [Kenen \(1990\)](#), [Sachs \(1990\)](#), [Fosu \(1999\)](#), [Iyoha \(1999\)](#), [Clements et al. \(2003\)](#), [Choong et al. \(2010\)](#), [Daud and Podivinsky \(2012\)](#), [Siddique et al. \(2016\)](#), [Ehikioya et al. \(2020\)](#). On this basis, the author proposes model 1 on the linear impact of external debt on economic growth as follows:

$$Y_{it} = \alpha_1 + \beta_1 ED_{it} + \delta_1 X_{it} + \varepsilon_{it} \quad (1)$$

Where:

Y is a variable representing economic growth, measured through the logarithm of GDP per capita, and this measurement is consistent with the previous views of [Daud and Podivinsky \(2012\)](#), [Ehikioya et al. \(2020\)](#), [Law et al. \(2021\)](#), [Makun \(2021\)](#).

ED is a variable representing external debt, determined through the ratio of external debt to GDP, and this measurement is also used in the majority of previous studies, such as: [Daud and Podivinsky \(2012\)](#), [Ehikioya et al. \(2020\)](#), [Law et al. \(2021\)](#), [Makun \(2021\)](#).

X is a set of control variables, including domestic investment (DI), trade openness (TRA), population growth (POP) and inflation (INF). Accordingly, DI is measured through the ratio of domestic investment to GDP ([Makun, 2021](#)), TRA is determined through total import and export turnover to GDP ([Daud & Podivinsky, 2012](#); [Ehikioya et al., 2020](#); [Law et al., 2021](#)), POP is the annual growth of total population ([Ehikioya et al., 2020](#); [Law et al., 2021](#)), INF is determined through the annual growth of the consumer price index ([Ehikioya et al., 2020](#); [Law et al., 2021](#)).

The detailed information about the variables in the research model is presented in Table 1.

Table 1. Variables in the model

Variable	Code	Measurement	References	Data source
Economic growth	Y	Logarithm of GDP per capita	Daud and Podivinsky (2012) , Ehikioya et al. (2020) , Law et al. (2021) , Makun (2021)	World Bank
External debt	ED	External debt to GDP	Daud and Podivinsky (2012) , Ehikioya et al. (2020) , Law et al. (2021) , Makun (2021)	World Bank
Domestic investment	DI	Domestic investment to GDP	Makun (2021)	World Bank
Trade openness	TRA	Total import and export turnover to GDP	Daud and Podivinsky (2012) , Ehikioya et al. (2020) , Law et al. (2021)	World Bank
Population growth	POP	Annual growth of total population	Ehikioya et al. (2020) , Law et al. (2021)	World Bank
Inflation	INF	Annual growth of the consumer price index	Ehikioya et al. (2020) , Law et al. (2021)	World Bank

Source: Author's proposal

The world does reveal that if external debt is kept to a certain level, then its role is significant for economic growth. This is especially true during the global crisis ([DeLong & Summers,](#)

2012; Law et al., 2021). Moreover, excessive and long-term external debt can worsen the recession status further (Kamin et al., 1989; Kenen, 1990; Sachs, 1990). In other words, the effect of external debt on growth during times of global crisis is likely to be more dramatic. To make this clear, the author constructs model 1 based on the interaction variable $ED \times GC$ which is an independent variable. So, the dummy variable GC represents the global crisis. As a result, the author can examine the effects of external debt on economic growth under conditions of global crisis.

$$Y_{it} = \alpha_2 + \beta_2 ED_{it} \times GC_{it} + \delta_2 X_{it} + \varepsilon_{it} \quad (2)$$

In model 2, global crisis (GC) is identified through a dummy variable. GC receives a value of 1 in the periods of global crisis, including: the global financial crisis (2007-2008), the European debt crisis (2009-2012) and the COVID-19 pandemic (2020-2021). GC receives a value of 0 in the periods without global crisis. This measurement is based on the views of Cayon et al. (2018), Kapan and Minoiu (2018), Law et al. (2021), Nguyen and Bui (2021). Other variables are like those in model 1. According to Cohen (1997), Pattillo et al. (2004), Clements et al. (2003), Cordella et al. (2010), Dauda et al. (2013), external debt can have a nonlinear impact on economic growth. In other words, there may be a threshold value 0 of external debt in model 1. Accordingly, the threshold model on the impact of external debt on economic growth has the following form:

$$Y_{it} = \alpha_3 + \beta_{31} ED_{it} I(ED_{it} \leq \lambda) + \beta_{32} ED_{it} I(ED_{it} > \lambda) + \delta_3 X_{it} + \varepsilon_{it} \quad (3)$$

In model 3, $I(\cdot)$ is an indicator function of the threshold variable ED . Other variables are similar to those in model 1.

Similar to the model of the linear impact of external debt on economic growth, model 3 is developed through the use of the interaction variable $ED \times GC$ as an independent variable. This means the author examines the impact of external debt on economic growth during the periods of global crisis, and this impact is considered in the regions before and after the threshold value of external debt. The variables in model 4 are similar to those in models (2) and (3).

$$Y_{it} = \alpha_4 + \beta_{41} ED_{it} I GC_{it} (ED_{it} \leq \lambda) + \beta_{42} ED_{it} I GC_{it} (ED_{it} > \lambda) + \delta_4 X_{it} + \varepsilon_{it} \quad (4)$$

In this study we use panel threshold effects and GMM to estimate research models. Originally suggested by Hansen (1999), the panel threshold technique was refined by Wang (2015) into a fixed-effects panel threshold model. This procedure allows external debt for analysis to discover and quantify different threshold values, thus enabling the analyses to capture any nonlinear relationships existing between external debt and economic growth. Threshold models are especially good at detecting regime shifts in parameter estimates when a threshold variable crosses an influential value (Nguyen, 2022).

Threshold effects are theoretically and evidence-based for the application (see, e.g., Cohen, 1997; Clements et al., 2003; Pattillo et al., 2004; Cordella et al., 2010; Dauda et al., 2013). However, the threshold methods adopted by Hansen (1999) and Wang (2015) work has only used fixed-effects regression for balanced panel data which does not take into consideration potential endogeneity. In macroeconomic panel data, this limitation is especially pertinent—where endogenous associations between variables are prevalent. Additionally, to overcome this concern the study also adopted the GMM estimator proposed by Arellano and Bond (1991). GMM is appropriate for analysis of panel data owing to its inherent ability to handle unobserved heterogeneity, simultaneity bias and endogeneity caused by omitted variables or reverse causality (Bui, 2023; Doytch & Uctum, 2011). The study combines GMM with threshold effects to capture both linear and nonlinear relationships while providing reliable and unbiased estimates for parameters. Such a synergistic system enables the complementary

advantages of both approaches to be integrated further, yielding stronger empirical outcomes. Bayesian estimation methods are also utilized to validate the linear and nonlinear models to determine the robustness of the models. As opposed to classical approaches, Bayesian estimation treats model parameters as random variables derived from probability distributions, as opposed to fixed point estimates (e.g., [Permai & Tanty, 2018](#)). This method is also crucial for understanding the distribution of the effects estimated, especially when using small samples ([McNeish, 2016](#)). These Bayesian findings confirm the results of GMM and threshold estimation, confirming the general reliability of the empirical analysis.

3. 2. DATA

The empirical analysis relies on a balanced panel dataset of seven countries in ASEAN Indonesia, Cambodia, Laos, Myanmar, the Philippines, Thailand, and Vietnam, covering the period 2002–2021. Countries and years without sufficient data were eliminated, to achieve the balanced structure necessary for threshold estimation. Since the World Bank database has no data on external debt for Brunei, Malaysia, and Singapore, these countries were excluded from the sample. The choice of the starting year, 2002, was chosen economically. Vietnam, for example, introduced Resolution No. 14-NQ/TW on March 18, 2002, which signified a major policy change and stressed the importance of the private sector. Beginning from that moment, external debt became important not only for the public sector but also for private economic activity. This selected period can include both stable conditions and key global crises, including the global financial crisis (2007–2008), the European debt crisis (2009–2012), and the COVID-19 pandemic (2020–2021), and is appropriate to allow a look at the analysis of debt dynamics under different macroeconomic conditions. All variables used in these model calculations were obtained from the World Bank database.

4. EMPIRICAL ANALYSIS

4. 1. BASIC STATISTICS

The research data sample was collected from 7 ASEAN countries during the period 2002–2021, including: Indonesia, Cambodia, Laos, Myanmar, the Philippines, Thailand and Vietnam. The descriptive statistical results of the data sample are shown in Table 2 below:

Table 2. Descriptive statistical results

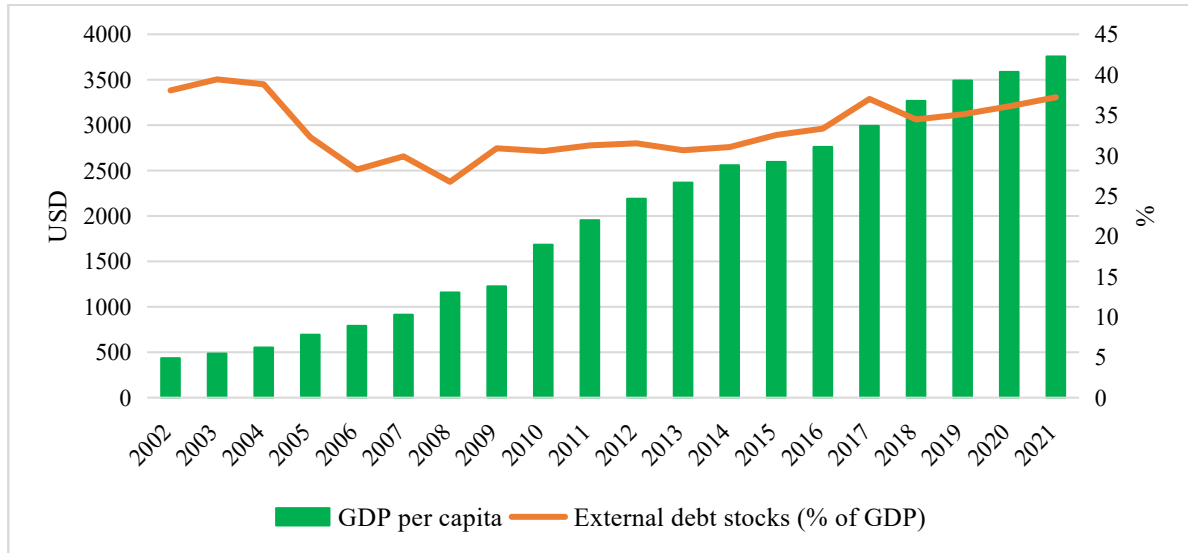
Variable	Mean	Std. Dev.	Min	Max
Y	7.38	0.87	4.88	8.94
ED	46.59	27.99	15.88	180.21
DI	26.71	5.93	16.02	39.57
TRA	89.10	41.48	11.86	186.47
POP	1.18	0.43	0.18	2.06
INF	5.99	7.29	-1.24	57.07

Source: Author's calculation

Table 2 shows that Y reached an average value of 7.38 (equivalent to 2,207.85 USD), the lowest value (4.88, equivalent to 131.47 USD) belonged to Myanmar in 2002, and the highest value (8.94, equivalent to 7,630.04 USD) belonged to Thailand in 2019. Regarding external

debt, ED reached an average value of 46.59%, the smallest value belonged to Myanmar in 2014 (15.88%), and the highest value belonged to Laos in 2002 (180.21%). Regarding the average value of ASEAN countries, Figure 3 shows that GDP per capita tended to increase significantly during the research period. Meanwhile, external debt decreased sharply in the period 2004-2008, and this indicator gradually increased again in the following years.

Figure 3. GDP per capita and average external debt of ASEAN countries



Source: Author's calculation

To explore more clearly the relationship between variables in the research model, the author conducted correlation coefficient analysis, and the results are shown in Table 3.

Table 3. Results of correlation coefficient analysis

Variable	Y	ED	ED×GC	DI	TRA	LF	INF
Y	1.00						
ED	-0.45	1.00					
ED×GC	0.03	0.22	1.00				
DI	0.25	-0.02	0.07	1.00			
TRA	0.22	-0.10	-0.01	0.13	1.00		
POP	-0.28	0.32	0.07	-0.27	-0.08	1.00	
INF	-0.54	0.20	0.01	-0.14	-0.29	-0.06	1.00

Source: Author's calculation

Table 3 shows that ED is negatively correlated with Y while the interaction variable ED×GC is positively correlated with Y. This indicates that external debt is positively correlated with Y in the periods of global crisis. Regarding control variables, domestic investment and trade openness are positively correlated with Y, whereas population growth and inflation are negatively correlated with Y.

4. 2. ESTIMATION RESULTS OF THE LINEAR IMPACT OF EXTERNAL DEBT ON ECONOMIC GROWTH

In this part, the author focused on estimating the linear impact of external debt on economic growth. At the same time, the author also clarifies this impact during the periods of global crisis.

Table 4. Results of testing the regression hypotheses in the linear impact models

Model	Modified Wald test	Wooldridge test	Mean VIF	Tests of endogeneity
Model 1	3,476.53*** (0.00)	376.72*** (0.00)	1.18	3.67*** (0.01)
Model 2	246.27*** (0.00)	1,030.66*** (0.00)	1.10	8.07*** (0.00)

Note: *** indicates significance at 1%

Source: Author's calculation

The results of testing the regression hypotheses in Table 4 show that the linear impact models have a low average variance inflation factor (VIF), meaning that the multicollinearity phenomenon is considered not serious. However, there is heteroscedasticity, autocorrelation, and endogeneity in the models. To overcome these phenomena, the author used the GMM method to estimate linear impact models, and the results are shown in Table 5.

Table 5. Estimation results of the linear impact of external debt on economic growth according to the GMM method

Y		Model 1	Model 2
ED		-0.009*** (0.00)	
ED×GC			0.008*** (0.00)
DI		0.036*** (0.00)	0.023*** (0.00)
TRA		0.002** (0.04)	0.002** (0.03)
POP		-0.183* (0.09)	-0.456*** (0.00)
INF		-0.103*** (0.00)	-0.073*** (0.00)
_cons		7.583*** (0.00)	7.573*** (0.00)
Wald chi2		105.78*** (0.00)	110.94*** (0.00)
Arellano-Bond test	AR (1)	-3.41*** (0.00)	-3.64*** (0.00)
	AR (2)	-0.35 (0.73)	-0.24 (0.81)
Sargant test		21.98 (0.14)	10.14 (0.43)

Note: ***, **, and * indicate significance at 1%, 5%, and 10%, respectively

Source: Author's calculation

Table 5 shows that the estimation results of GMM-based linear models are statistically significant and all tests are consistent. As a result, the estimation results indicate that ED negatively influences Y (model 1) and the interaction variable ED×GC positively affects Y (model 2). This suggests that external debt can boost economic growth in times of global crisis. Re-

garding the control variables, the estimation of linear impact models shows that DI and TRA positively impact Y, whereas POP and INF negatively impact Y. To verify the robustness of these linear impact models, the author estimated these models using the Bayesian method. Using this method, aside from validating the robustness of the research model, the estimation outcomes also show the probability of the impact of external debt on economic growth, which cannot be solved by traditional estimation methods. Results obtained from estimating linear impact models through the Bayesian approach are shown in Table 6.

Table 6. Estimation results of the linear impact of external debt on economic growth according to the Bayesian method

Y	Model 1		Model 2	
	Mean	Probability of mean	Mean	Probability of mean
ED	-0.009 [-0.014; -0.005]	0.99		
ED×GC			0.001 [-0.003; 0.006]	0.72
DI	0.041 [0.022; 0.061]	0.99	0.038 [0.018; 0.060]	0.99
TRA	0.002 [-0.001; 0.005]	0.92	0.002 [-0.001; 0.005]	0.93
POP	-0.117 [-0.403; 0.176]	0.79	-0.311 [-0.597; -0.018]	0.98
INF	-0.047 [-0.063; -0.030]	1	-0.054 [-0.071; -0.037]	1
_cons	6.934 [6.169; 7.660]	1	6.800 [5.987; 7.574]	1
Avg acceptance rate	1		1	
Avg efficiency: min	0.76		0.75	
Max Gelman-Rubin Rc	1		1	

Source: Author's calculation

The indicators, avg acceptance rate, avg efficiency, and max Gelman-Rubin Rc are satisfactory (Table 6). Here, we have an appropriate result of estimating the linear impact model in the Bayesian way. Thus, it is hypothesized that ED has a negative impact on Y with 99% probability whereas the interaction variable ED×GC exerts a positive impact on Y with 72% probability. Moreover, a negative impact of external debt is present for Y during the entire research period but positive during the periods of global crisis. These findings are entirely consistent with the estimation results obtained by the GMM-based method used in Table 5. Yet one aspect of Bayesian model estimation results that is interesting is the fact that this method shows the impact probability of the variables in the research model. In particular, there is quite a high probability of an adverse effect of external debt on growth (99%). The probability of positive effects of external debt on economic growth is 72%, which is lower than that in the entire research period, but significantly it is still at a significant level in the period of global crisis. For the control variables, Y is positively impacted by DI and TRA, whereas POP and INF negatively impact Y. These impacts carry a relatively high probability. Overall, the model estimation results with the Bayesian method are totally compatible with the GMM method estimation results, namely, linear impact models have robustness.

4. 3. ESTIMATION RESULTS OF THE NONLINEAR IMPACT OF EXTERNAL DEBT ON ECONOMIC GROWTH

In this part, the author focused on examining the nonlinear impact of external debt on economic growth. Moreover, the author also clarified this impact during the periods of global crisis. First, the author tested the existence of a threshold value (λ) of ED in the research model by using the threshold effects proposed by Hansen (1999) and the results are presented in Table 7.

Table 7. Results of testing threshold effects

Model	Threshold	Lower	Upper
λ	37.29%	35.71%	37.30%
Prob	0.00***		

Note: *** indicates significance at 1%

Source: Author's calculation

Table 7 shows that there is a threshold value of ED with $\lambda = 37.29\%$. In other words, the impact of external debt on economic growth can exist in a nonlinear form, which means the impact level of external debt on economic growth in regions before and after the threshold value λ may be different. Therefore, the author conducted an analysis of the nonlinear impact model by estimating the impact of external debt on economic growth in regions before and after the threshold value λ , and the estimation results are presented in models 3 and 4.

Table 8. Results of testing regression hypotheses in the nonlinear impact model

Model	Modified Wald test	Wooldridge test	Mean VIF	Tests of endogeneity
Model 3	1,839.85*** (0.00)	429.72*** (0.00)	1.98	17.03*** (0.00)
Model 4	423.12*** (0.00)	881.33*** (0.00)	1.10	4.47*** (0.00)

Note: *** indicates significance at 1%

Source: Author's calculation

Table 8 shows that the average VIF is quite low, meaning that the multicollinearity phenomenon is considered not serious. However, models 3 and 4 show heteroscedasticity, autocorrelation, and endogeneity. Therefore, the author estimated models 3 and 4 by using the GMM method to overcome the above phenomena. The estimation results are presented in Table 9.

Table 9. Estimation results of the nonlinear impact of external debt on economic growth according to the GMM method

Y		Model 3	Model 4
ED ($ED \leq 37.29\%$)		-0.005 (0.52)	
ED ($ED > 37.29\%$)		-0.007* (0.09)	
ED×GC ($ED \leq 37.29\%$)			0.021*** (0.001)
ED×GC ($ED > 37.29\%$)			-0.005** (0.05)
DI		0.030*** (0.01)	0.076*** (0.00)
TRA		0.003** (0.02)	0.002* (0.08)
POP		-0.480** (0.05)	-0.175* (0.09)
INF		-0.109*** (0.00)	-0.159*** (0.00)
_cons		7.936*** (0.00)	6.233*** (0.00)
Wald chi2		93.74*** (0.00)	64.35*** (0.00)
Arellano-Bond test	AR(1)	-2.25** (0.02)	-2.46*** (0.01)
	AR(2)	-1.46 (0.15)	0.46 (0.65)
Sargan test		23.14 (0.28)	1.55 (0.46)

Note: ***, **, and * indicate significance at 1%, 5%, and 10%, respectively

Source: Author's calculation

The estimation results of the nonlinear models based on the GMM method are significant, and all testing is consistent (Table 9). The estimation results obtained by model 3 specifically show that external debt has a negative impact (-0.007) on economic growth, and it is evident when external debt exceeds 37.29%. Thus, higher levels of external debt (generally above the threshold value of 37.29%) result in a deceleration of capital investment, a burden on states, and an economic impact. Model 4 estimates show the nonlinear, inverted U-shaped effect of external debt on economic growth in global crisis periods, which is also in line with the Laffer curve of external debt. Hence, external debt provides a positive (0.021) effect on economic growth when external debt is maintained below the threshold value of 37.29%. The effect of external debt on economic growth is negative (-0.005) when external debt is greater than the threshold value of 37.29%. The model 3 and 4 estimation results from control variables are just like its linear impact models. DI and TRA have a positive effect on Y and POP and INF have a negative effect on Y.

Table 10. Estimation results of the nonlinear impact of external debt on economic growth according to the Bayesian method

Y	Model 3		Model 4	
	Mean	Probability of mean	Mean	Probability of mean
ED ($ED \leq 37.29\%$)	0.019 [0.006; 0.032]	0.99		
ED ($ED > 37.29\%$)	-0.002 [-0.007; 0.003]	0.81		
ED×GC ($ED \leq 37.29\%$)			0.010 [0.001; 0.020]	0.99
ED×GC ($ED > 37.29\%$)			-0.001 [-0.005; 0.005]	0.55
DI	0.029 [0.010; 0.048]	0.99	0.039 [0.019; 0.060]	0.99
TRA	0.001 [-0.001; 0.004]	0.85	0.002 [-0.001; 0.005]	0.92
POP	-0.106 [-0.374; 0.168]	0.78	-0.305 [-0.588; -0.017]	0.98
INF	-0.048 [-0.063; -0.032]	1	-0.055 [-0.072; -0.038]	1
_cons	6.642 [5.889; 7.364]	1	6.740 [5.923; 7.508]	1
Avg acceptance rate	1		1	
Avg efficiency: min	0.74		0.75	
Max Gelman-Rubin Rc	1		1	

Source: Author's calculation

Like the linear impact model, the author tested the robustness of the nonlinear impact models by using the Bayesian method, and the estimation results are presented in Table 10. Accordingly, the estimation results of models 3 and 4 according to the Bayesian method are consistent with the estimation results according to the GMM method, which means that the nonlinear impact models ensure robustness.

4. 4. DISCUSSION

The evaluation results by the models indicated that external debt substantially affects economic growth, which may be represented as a linear or a nonlinear effect. This research results emphasize that the global crisis could alter the influence of external debt level on economic growth, which is a new finding of this study compared to previous studies. Thus, this section is dedicated to presentation of the main findings, highlighting its novel findings: newly available ASEAN-related evidence, the import of external debt thresholds and differentiated impacts during global crises. The linear relationship between external debt and economic growth: As predicted based on the cost-benefit estimate of model 1, the effect of external debt on economic growth is negative; H_{1a} is accepted. Such estimation results are in line with earlier research from [Kenen \(1990\)](#), [Sachs \(1990\)](#), [Fosu \(1999\)](#), [Iyoha \(1999\)](#), [Clements et al. \(2003\)](#), [Choong et al. \(2010\)](#), [Daud and Podivinsky \(2012\)](#), [Siddique et al. \(2016\)](#), [Ehikioya et al. \(2020\)](#). Based on model 2 estimates, this effect is positive in the global crisis situations, so hypothesis H_{1b} is accepted. It suggests that the influence of external debt on economic growth differs in

different periods. This impact is commendable for economic growth during global crisis episodes and is a new discovery of this investigation. In also noting that the influence level of external debt on economic growth can vary from one period to another, this report also raises the possibility that the influence of foreign debt on economic growth can be nonlinear. The author must proceed with the analysis of such impact as nonlinear. Nonlinearity in the relationship between external debt and economic growth: The study indicated there exists a “threshold” value of external debt; the threshold value is 37.29%. Hence, the hypothesis H_{2a} is accepted and is consistent with the prior statements of [Cohen \(1997\)](#), [Pattillo et al. \(2004\)](#), [Clements et al. \(2003\)](#), [Adegbite et al. \(2008\)](#), [Cordella et al. \(2010\)](#), [Dauda et al. \(2013\)](#). Nonetheless, because of previous studies, the threshold value of external debt obtained in this work is much different. Our study shows the threshold value of external debt as 37.29%, while [Cohen \(1997\)](#) estimates that the threshold value of external debt in Latin American and African countries is 50%. Furthermore, [Clements et al. \(2003\)](#) find that the threshold for external debt in 55 low-income countries is 25%. Thus, we can infer that the effect of external loans on economic growth may be non-linear, the effects of external loans on economic growth before the threshold value and after it may vary. Based on the modeling of model 3, external debt negatively influences economic growth, and we can clearly see that when external debt becomes over a threshold value of 37.29%, we can conclude that hypothesis H_{2c} is true. Consequently, when the external debt value goes above 37.29%, external debt impedes investment and forms a burden on a country which limits its economy in terms of expansion. This result concurs with previous statement of [Hofman and Reisen \(1991\)](#), [Cohen \(1993\)](#), [Hansen \(2004\)](#), [Presbitero \(2006\)](#), [Jayaraman and Lau \(2009\)](#). These estimates also show (through the analysis of the model 4) that the effects of external debts on global economic growth in times of crisis are non-linear; hence the relationship presents itself with the inverted U-shape, this is consistent with the Laffer curve of external debt. Thus, if the external debt is less than the threshold value of 37.29%, it has a positive impact on economic growth, which means that hypothesis H_{2b} is accepted. If this is greater than the threshold value of 37.29% (external debt), then external debt’s impact on economic growth is negative and hypothesis H_{2c} is accepted. These findings provide evidence for the earlier assertions of [Adegbite et al. \(2008\)](#), [Cordella et al. \(2010\)](#), [Dauda et al. \(2013\)](#) when this study finds the inverted U-shaped nonlinear effect of external debt on economic growth. But the results of estimation suggest that the non-linear effects of external debt on economic growth in certain times of global crisis are more intense than they are other time periods, finding a new result in the findings of this analysis. Therefore, external debt is one of these financial sources for the ASEAN countries in adopting economic growth policies, resulting to decrease the level of economic recession even during the era of world crisis. While that happens, it adds to the burden of ASEAN countries by increasing debt and not properly utilized, which can make the expansion of global economy difficult, even intensify the level of economic recession. Thus, external shocks from the global crisis can magnify the effect of external debt on economic growth in ASEAN countries, and this is an interesting conclusion of this research.

Table 11. External debt compared to threshold value in ASEAN countries

Year	Indonesia	Campuchia	Laos	Myanmar	The Philip-pines	Thailand	Vietnam
2002	Above the threshold	Above the threshold	Above the threshold	Above the threshold	Above the threshold	Above the threshold	Above the threshold
2003	Above the threshold	Above the threshold	Above the threshold	Above the threshold	Above the threshold	Above the threshold	Above the threshold
2004	Above the threshold	Above the threshold	Above the threshold	Above the threshold	Above the threshold	Below the threshold	Above the threshold
2005	Above the threshold	Above the threshold	Above the threshold	Above the threshold	Above the threshold	Below the threshold	Below the threshold
2006	Above the threshold	Above the threshold	Above the threshold	Above the threshold	Above the threshold	Below the threshold	Below the threshold
2007	Below the threshold	Below the threshold	Above the threshold	Above the threshold	Above the threshold	Below the threshold	Below the threshold
2008	Below the threshold	Below the threshold	Above the threshold	Above the threshold	Below the threshold	Below the threshold	Below the threshold
2009	Below the threshold	Below the threshold	Above the threshold	Below the threshold	Below the threshold	Below the threshold	Below the threshold
2010	Below the threshold	Below the threshold	Above the threshold	Below the threshold	Below the threshold	Below the threshold	Below the threshold
2011	Below the threshold	Below the threshold	Above the threshold	Below the threshold	Below the threshold	Below the threshold	Below the threshold
2012	Below the threshold	Above the threshold	Above the threshold	Below the threshold	Below the threshold	Below the threshold	Below the threshold
2013	Below the threshold	Above the threshold	Above the threshold	Below the threshold	Below the threshold	Below the threshold	Below the threshold
2014	Below the threshold	Above the threshold	Above the threshold	Below the threshold	Below the threshold	Below the threshold	Below the threshold
2015	Below the threshold	Above the threshold	Above the threshold	Below the threshold	Below the threshold	Below the threshold	Below the threshold
2016	Below the threshold	Above the threshold	Above the threshold	Below the threshold	Below the threshold	Below the threshold	Below the threshold
2017	Below the threshold	Above the threshold	Above the threshold	Below the threshold	Below the threshold	Below the threshold	Below the threshold
2018	Below the threshold	Above the threshold	Above the threshold	Below the threshold	Below the threshold	Below the threshold	Below the threshold
2019	Below the threshold	Above the threshold	Above the threshold	Below the threshold	Below the threshold	Below the threshold	Below the threshold
2020	Above the threshold	Above the threshold	Above the threshold	Below the threshold	Below the threshold	Above the threshold	Below the threshold

Source: Author's calculation

It is found that when external debt is below the level of 37.29% of GDP, it positively influences economic growth in the ASEAN member governments and this tendency is stronger in periods of crises in the world economic domain. When external debt is above this threshold though the growth potential in the economy is lost and the economy deteriorates, on the flip side. The available empirical evidence suggests that ASEAN countries were more inclined to decrease their exposure to external debt during global crises (Table 11). During the global financial crisis of 2007, for instance, Indonesia, Cambodia, Myanmar, and the Philippines reduced their

external debt to below the 37.29% mark, a step which was successful in easing the pressure to service their debts under a harsh economy. Thailand and Vietnam had decreased their external debt to the level below it also in 2003 and 2004, respectively. In terms of external debt, Laos rates the highest in the region, with the debt as much as 180.21% of GDP in 2002 and 68.35% in 2013. Laos' external debt was above the threshold as defined during the entire research. After the COVID-19 crisis had begun, external borrowing among ASEAN states was on the rise on account of falling fiscal revenues and increasing expenditures on crisis relief and economic reform. Some countries, such as Indonesia and Thailand, then also surpassed the thresholds of 37.29%. The relationship between outside debt and growth in ASEAN countries corresponds to the structural traits of these economies and can be understood by several transmission mechanisms. First, external debt affects growth as an investment channel: for a productive use of borrowed capital relieves the financing constraints and promotes growth, but excessive debts result in debt overhang effects that inhibit private investment. Second, external borrowing influences aggregate domestic demand especially in times of worldwide crises by maintaining public expenditure and stabilizing the growth rate. Third, increased debt-service burdens exert fiscal pressures that can squeeze critical government expenditures, explaining the harmful growth performance at debt levels beyond the upper limit. Cumulatively, these mechanisms elucidate why the growth effects of external debt depend both on the macroscale and on the occurrence of global crises. In the model estimation for control variables, inflation (INF) and population growth (POP) are negatively associated with economic growth, while domestic investment (DI) and trade openness (TRA) have a positive effect. Hence, aside from keeping external debt at sub-the figure of 37.29%, policies encouraging domestic investment and increasing trade openness can further fuel a growth of ASEAN economies. In contrast, high inflation and rapid population growth are hindrances to steady economic growth. These findings are in line with earlier empirical evidence (Daud & Podivinsky, 2012; Ehikioya et al., 2020; Law et al., 2021; Makun, 2021). Collectively the findings establish that the effect of external debt on economic growth is only partially related to the level of debt and intensified in times of global crises. When external debt stays below 37.29% it should spur economic growth, especially in periods of crisis, but it does worse when it is extended beyond this level. As a result, ASEAN countries should keep external debt under sustainable limits and ensure that debt is used more efficiently to meet capital needs and to sustain economic growth. This advice is more of importance for low- and middle-income nations with consistently high levels of debt, for example Cambodia, Laos and Thailand (Table 11). These findings are new evidence that has been introduced into the literature due to the relatively sparse distinction between crisis and non -crisis periods in the existing literature and to have little evidence specific to ASEAN. Furthermore, the integration of GMM, threshold estimation and Bayesian approaches enhances the validity and provides firm policy guidance.

5. CONCLUSION AND POLICY IMPLICATIONS

5.1. CONCLUSION

This paper will first look at the effect of external debt on economic growth in ASEAN countries, which will be analyzed both in a linear and a nonlinear way. Moreover, some empirical studies on the effects of external debt in ASEAN's economic growth during the global crisis have also been undertaken on the other side, which is an intriguing part of this research. As seen via estimates from GMM method and Bayesian method, external debt effect on economic growth will be major in a linear as well as nonlinear way. Its impact becomes clearer and more impressive within these global crisis periods. More specifically, with respect to linear impact, external debt has a negative effect on economic growth on the whole research phase,

but positive effect on expansion within the world crisis period. The effects of external debt on economic growth in an inverted U-shape are clearly and significantly shown in an inverted form through the periods of the global crisis in nonlinear form. This shows that shocks from a global crisis, in general, may exacerbate the impact of external debt in the context of economic growth. External debt is also one of the key financial resources during these periods so that ASEAN countries can put in place policies to promote economic growth, even lowering the level of economic recession during crisis in the world. On the contrary, such excessive and unfulfilled external debt can further burden ASEAN countries, hinder economic growth, and even worsen the level of economic recession.

5. 2. POLICY IMPLICATIONS

The empirical findings show that external debt has significant effects on growth in both the linear and nonlinear directions. And the effect becomes stronger and significantly changes during global crisis. These results represent a strong base for ASEAN countries to design the necessary external debt policies that could induce growth in the region. One implication is that external debt needs to be kept below our threshold of 37.29% of GDP. This is of particular importance for countries that are already exceeding the threshold (e.g., Cambodia 74.26% of GDP in 2021, Laos 91.29% and Thailand 41.70%). Moreover, it may also be required to strengthen debt management and capital use process to achieve higher returns from borrowing from external sources. To reach these goals, several policy priorities are needed. First, there is an effort for ASEAN countries to differentiate external debt management of private and public sectors. Because there is evidence that high aggregate debt limits on aggregate debt stifle growth, restrictions on sector-specific debts, especially for public-sector borrowing could help to monitor and adjust debt structures more efficiently and sooner. Second, mechanisms to manage and use external debt must be transparent. Debt-funded projects must reveal progress on the implementation of the measures, costs allocated, and the results achieved. Increased checks and balances of the applicable institutions are needed to reduce delays, expedite disbursement and mitigate project hold-ups. Reforming anti-corruption, such as within agencies responsible for debt management, is also essential. Third, countries need to increase their ability to mobilize, absorb, and allocate external debt efficiently. There are growth effects to debt-financed investment below the threshold, which means that debt-financed investments should be targeted toward high-yield projects that have a concrete impact on economic growth. Simultaneously, the future debt-servicing capacity should be determined, that is, enhancing foreign exchange earnings through export support and value creation at home. Fourth, this should be at minimum reducing the reliance on external borrowing. ASEAN states should allocate better resources to domestic bank capacity in conjunction with external debt to improve capital formation, especially in the private sphere. Spending domestic savings to invest can relieve repayment pressures without compromising growth-based funding. Fifth, there ought to be more focus on the prediction of external debt dynamics and analysis of risks of the debt accumulation and global crisis. As the evidence suggests that the impact of debt-induced growth is even greater in crisis, mechanisms for advance warning, better forecasts and early warning signals in preparedness and policy actions are required to increase the ability to respond. To that extent, external debt policies need to be accompanied by broader macroeconomic measures, such as encouraging domestic investment, increasing trade openness, containing inflation, and facilitating sustainable population growth. As the estimated effects of control variables in the model state, stable macroeconomic environment improves external debt utilization and bolsters long-term growth prospects. Collectively these policy proposals are based on evidence of both the linear and nonlinear effects of external debt together with the interactions with international crises. By integrating these findings into their debt management policies, ASEAN countries

can develop more effective policies and support sustainable economic growth.

5. 3. FURTHER RESEARCH SUGGESTIONS

The objectives were met for this study by examining the influence of external debt on economic growth in ASEAN countries and taking into account this influence during periods of global crisis. Yet, this study also has certain limitations. For instance, the sample size of the study is small, especially in terms of how many countries are involved in the selection. Conversely, due to data restrictions it has been prevented from estimating research models for each country. Moreover, some control variables could have an impact on economic growth (such as the development of the financial system, institutional quality, or foreign direct investment) but they have not been included in this study. However, the mentioned limitations indicate potential fruitful avenues for future studies.

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