
SUSTAINABLE DEVELOPMENT FACETS: DOES SOVEREIGN DEBT ACCELERATE THE ECONOMIC GROWTH**Sudawan Somjai¹, Saroge Vasuvanich², Akarapitta Meechaiwong³, Watcharin Joemsittiprasert^{4*}**¹Graduate School, Suan Sunandha Rajabhat University, Bangkok, Thailand²Thai Summit Harness (Public) Co., Ltd, Chonburi, Thailand³Engineering Reward (Thailand) Co., Ltd., Bangkok, Thailand⁴Division of Business Administration, ASA College, New York, USAE-mails: ¹sudawan.so@ssru.ac.th; ²saroge_v@thaisummit-harness.co.th;³contactus@engineeringreward.com; ^{4*}watjoemsittiprasert1@asa.edu (corresponding author)*Received 17 February 2019; accepted 28 October 2019; published 30 December 2019*

Abstract. The prime objective of the current study is to investigate the total sovereign debt on the economic growth of Thailand. Since domestic debt is considered to be an economic growth stimulator particularly during the period of recession, therefore, its instruments are intended to analyze in this research. In a country, the lack of funds may negatively influence economic growth, therefore, most countries like to use external debt to finance its expenditures, such as Thailand. This situation can be improved by focusing on these countries developmental research. In Thailand, the information scarcity regarding domestic debt acts as a policy constraint while designing an effective domestic debt mobilization policy. Thus, the present study predominantly aims to investigate the domestic debt effects on Thailand economic growth. The study has examined the domestic debt effects on the economic growth, during 1998-2018. The variables used in this study are extracted from the previous literature and the theoretical framework used in this study. The key variables analyzed are Treasury bills, Government securities, and Investment issues, not forgetting the loans mainly housing loans fund, market loans of Thailand. The study has used the Johansen and Juselius co-integration approach to examine the long run relationship while ECM approach was used to see the speed of adjustment in the short run. Furthermore, we have conducted the Lagrange Multiplier test to all variables to check the presence of autocorrelation. The results show that there is no autocorrelation in the variables. For the instrument of Government securities, we have found that all the variables which are financial sector, social security institutions, insurance companies, and financial sector show a statistically significant result in long run analysis. On the other hand, short run analysis based on ECM model shows that social security institution, insurance companies, financial sector and foreign holders turn to be significant while public sector show insignificant results. The result for ECM also shows that the model is well adjusted in the short run.

Keywords: Total debt; investment; Economic growth; Thailand

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JEL Classifications: 01, I1, I2, I3

1. Background

Achieving of sustainable development goals inevitable depends on economic growth potential (Baltgailis, 2019). Developing countries, as Thailand, as a rule encounters a problem of lack of capital resources. However, it is almost impossible to overcome this problem as capital resources are limited, and the problem is more severe shortage during economic recession. Therefore, the government should find alternatives or solutions to ensure that barriers or limitations in capital resources do not hinder economic activities for the development and welfare of the people in the country (Sauvé, Bernard, & Sloan, 2016). This is because sources of capital or funds are a very important requirement for carrying out planned economic activities.

Just as individual needs, the needs of the country as a whole increase continuously. The increase in the public needs is matched by the desire of the government to increase the income and welfare of the people in the country. Social welfare does not depend on any single variable or indicator, but on several indicators, some are economic in nature while others are social in nature. The growth of the public sector means an increase in public expenditures. The increase in public expenditures will not only distort the structure of the current income sources but will also force the state to implement additional methods to increase income (Simon, 2019; Sasongko et al., 2019; Finogentova et al. 2018; Vandina et al., 2018; Nikitina et al., 2018; Rustiadi, Ahmad, 2019).

It is well known that taxation, increasing the money supply, and incurring domestic debt are methods of financing public expenditures. Both methods have their shortcomings: increase in tax burden leads to shadow economy (e.g. Osipov et al.; Newman et al., 2018; Markina et al., 2018), and debt puts load on future generations.

Governments do not finance all its expenditures from tax revenue. The other method of finance is borrowing from the public. When government spending exceeds tax revenues, the difference can be financed by selling government bonds and bills. Usually, governments prefer to engage in debt to finance public expenditures rather than increase taxes. The market from where governments do the borrowings is generally from within the country or the domestic market and the instrument is commonly known as domestic debt.

Domestic debt is classified into national debt which comprises of those liabilities owed by government and citizens. For example, Thailand's domestic debt includes Treasury bills, Government Securities, Investment Issues and other loans. Domestic debt is different from sovereign debt. National government is responsible for the issuance of government bond which is often labeled in terms of domestic currency of a country. However, sovereign bonds are the ones which national government issue in foreign currencies. Government domestic debt can also be defined as the money owed either by federal, central, local or municipal government (Irwin, 2015). It is a taxpayers' indirect debt which can be further classified into internal debt payable to the lenders of the home country. Moreover, the public debt are those obligations having more than a year time for repayment. Public debt also comprises of external and domestic debt. The domestic debt involves those loans that are granted to the central government by financial institutions or domestic banks. On the other hand, public external debt is generally classified in terms of creditor, borrower and by its level of maturity (Borio, 2014). However, the amount of total debt that is received throughout the decades must be considered separately from the federal budget deficit, where federal budget deficit is the excessive spending out of the federal government's income during a fiscal year.

The relationship between domestic debt and economic growth is somewhat complicated as domestic debt could be either good or bad for economic growth. The effect of domestic debt on growth depends on how the government utilizes the money borrowed. For developing countries such as the East Asian countries which are usually lacking in capital, besides external debt, domestic debt also plays a key role in the promoting economic development. Over the past few years, countries while adopting aggressive policies or while involving in net borrowing look out for domestic sources to substitute public external debt with domestically issued debt. A few countries indulge in domestic fiscal liabilities to sterilize the extensive aid inflows. If a country's access to the resources improve with the external borrowing then domestic borrowing may allow the transferring of resources, from public to the private sector.

In the normal course of development, there are many problems faced by a developing country. For instance, in Thailand one such problem is a small capital stock. Capital as a source of development financing could come from domestic sources or from outside the country (Evans, 2018). Capital resources from abroad, in the form of external debt is very risky. Not only do they burden the state annual budget revenue and expenditure but are usually accompanied by interference of the donor countries in the internal affairs of the recipient countries. This made many countries sceptical of securing capital from abroad. In other words, external capital is the last alternative for these countries. External loans function as a complement to domestic funds in the case that domestic funds are insufficient to finance development activities in Thailand. However, depending too much on external loans as the main source of development financing creates a dependence on the foreign countries

or donors, giving rise to an increasingly heavy debt burden (Loxley, 2019). In Thailand's case, it results in the foreign exchange and economic crises in the middle of 1997.

One of the steps used to strengthen the foundation for the development and economic growth Thailand is to reduce the dependence on foreign capital flows (especially short-term capital flows) and foreign loans which have become one of the causes of the economic downturns in Thailand. Consequently, the mobilization of domestic funds is a very crucial issue to reduce the country's dependence on foreign capital and foreign loans. Banking institutions play important role in collecting and mobilizing savings (Jacob & Innocent, 2019). Households set aside a portion of their income that is not consumed as savings. These savings will be collected by the banks as third-party funds (TPF). Savings play important role in economic development. The effect of government policies is positive as seen from the rapid increase in deposits and saving deposits even though some problems still plaque our economic stability in general. As a result of the deregulation policy in the banking industry, the economy becoming more global because of the export oriented economy, the increasing role of foreign capital (FDI), more sophisticated and open communication system, the economy is more vulnerable to the workings of the global financial markets (Karwowski & Stockhammer, 2017).

In order to avoid ever-increasing public debts, many Asian economies are required to increase their efforts towards fiscal consolidation. In particular, those adjustments which shrink the fiscal deficits may result in stronger economic growth, whereas, adjustments which are carried out by reducing expenditures tend to be more sustainable and successful as compared to the ones which are led by increase in taxes. Sustainable debt refers to the level of debt that completely fulfils the future as well as current debt service obligations of a debtor country, without rescheduling or employing further debt, and also avoids the accumulation of outstanding payments, while achieving an acceptable economic growth level (Nissanke, 2019). In order to assess the nature of national debt i.e. whether it is small or large, it can be compared to the national economy's product or income, since further borrowing or taxation are the principal payments and ultimate sources of interest. The sovereign debt in Thailand has increased signficiatly (see figure 1).

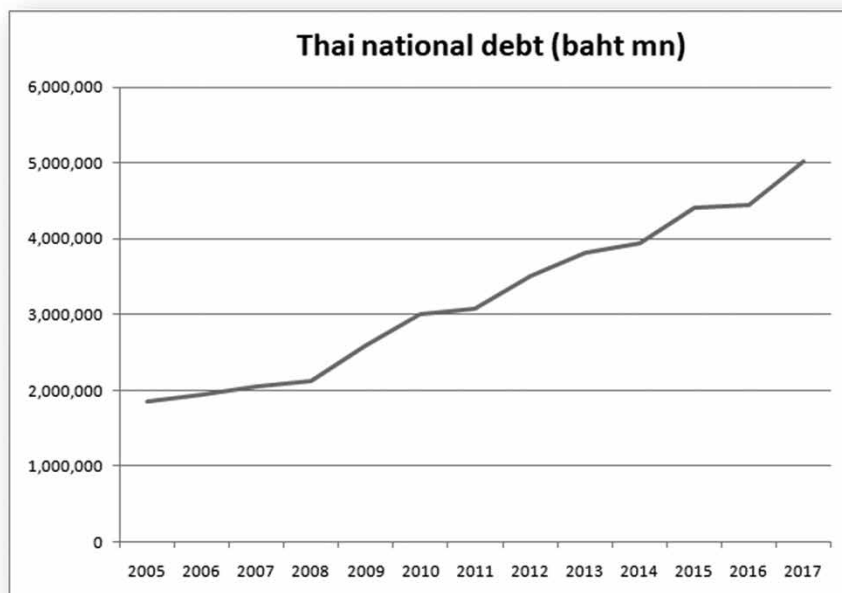


Figure 1: Total debt of Thailand (2004-2017)

Several developing economies, such as Thailand, could not restrict their public domestic debt growth. It is important to keep public domestic debt at low levels to ensure the availability of sufficient revenues for financing other development expenditures by government. Besides other factors, reduction in external donor support, sluggish real revenue receipts and unending expenditure pressures have given rise to high domestic

debt particularly in developing countries during 1990's (Hardt, 2019). Thus, different domestic debt components or domestic debt size can be analyzed to assess the domestic debt evolution. Stock of government debt is generally estimated in proportion to national output. The three theoretical reasons revealed for the government domestic debts are: 1) for financing budget deficit, 2) for monetary policy implementation (i.e. treasury bills buying and selling in open market operations); and 3) for establishing financial instruments (for financial markets deepening).

This study aims to use the most recent data to analyse the effect of domestic debt on economic growth in Thailand. We can see that in the recent years, the government has presented budgets that encourage the use of Government securities, Treasury bills and Investment Issues. (Pereira & Wemans, 2015) . While facing external debt issues, it is important to squeeze domestic demand to create current account surplus in the balance of payments. Relaxing financial markets may inflate the interest rate which could create problems to finance existing debt and making further government borrowing to finance the previous debt would result in stacking up of domestic debts. Moreover, the severely indebted economies with huge external debts are mostly encountered with solvency problem, restricting them from further borrowing from external sources and switch to the domestic borrowing.

2. Theoretical Frameworks

The Neoclassical view states that there exists a negative relationship among economic growth and public debt. Therefore, the growth models together with issuing public agent's debts for financing capital or consumption goods create a negative association among economic growth and public debt. The government debt through causing its effect on the interest rates indirectly impact economic growth in the long run. According to a traditional view, increasing government debt will increase the burden on the economy. This increase in government debt would make consumer wealthier in the short run, resulting in higher consumer spending and this increased in consumer spending would give rise to an increase in goods and services demand, which would in turn increase employment and output in the short run (Chodorow-Reich, 2019). This condition would increase private savings and decrease government dissaving, since marginal propensity to save is comparatively lower than marginal propensity to consume. This would give rise to an increase in real interest rate in the economy, which will encourage the inflow of capital from outside the country. Whereas, the higher rate of interest will not encourage investors to invest in the long run, resulting in crowding out effect on private investment. Thus, there will be smaller stock of capital available because of lower savings. In addition, there will be greater foreign debt from abroad. Thus, greater aggregate demand will increase prices that will automatically adjust in the long run and get back to natural output (Auclert & Rognlie, 2018). However, lower investment will bring lower output and lower steady state capital stock, with smaller effect on total output as a whole, followed by low consumption and economic welfare, which also referred as public debt burden, since each generation shifts burden to the later one, with a smaller stock of capital leaving behind (Saungweme & Odhiambo, 2019; Warjiyo, Juhro, & Warjiyo, 2019).

The Ricardian theory considers government debt and future taxes as equivalent (Tran, 2019). Considering consumer as forward-looking and rational make current deficit and discounted sum of future taxes to be equal. It creates a shift between deficits and taxes and create no aggregate wealth effects, resulting in increased government debt keeping consumption unchanged. Thus, the total savings by rational consumers will remain the same, who currently face deficits to save for the future tax increase. Increase in private savings would be equivalent to a reduction in government dissaving. According to the Ricardian's unchanged total savings view, the interest rates and investment will remain unaffected, whereas, the effect will be on the national income. According to Johnson (2018), the domestic debt is incurred as a result of tax liability postponement from the present to the future generation. Such situations of shifting from current to future system of taxation involves the transferring of tax-burden from present to the future generation. National debt acts as a future generation's burden which arises in the form of reduction in the income flow from lower private capital stock. Thus, it is the operative inter-generational transfers which cause a movement of current taxation to the future time involving no debt issue on future generations.

In developing economies, the fiscal sustainability and debt dynamics are becoming the huge concerns of policy makers. Developing economies are required to be dependent upon domestic debt due to difficulty obtaining external debts for accomplishing their development projects. Domestic debt may have a crowding effect on the domestic private investment, with long-run unsustainability. However, the domestic debt sustainability can be estimated by calculating the domestic debt to GDP ratio. Fiscal sustainability can be measured when the public debt to GDP ratio is found to be stationary (Hoai, Thanh, & Tung, 2015), which suggests the non-stationary public debt to GDP ratio as unsustainable. The Section 46 (b) for Fiscal Responsibility Act is the act regarding debt management framework, thus, achieving sustainable public debt to GDP ratio must be ensured by the Government. (Isibor, Babajide, & Osuma, 2018) suggested that the government borrowing from the internal sources is the main government expenditure financing source after the fall in internal oil prices. In another study, Shehu reported that the weak fiscal imbalances started in 1980s and continued till 1990s, with a rapid increase in unsustainable public debt. This is due to the increasing debt service cost effects which deal with larger share of government spending during chronic fiscal imbalances. Public debt unsustainability impel Central Bank to take inflationary action for monetizing debt. According to Hoai et al. (2015), when public debt to GDP ratio is stationary, fiscal sustainability will be achieved. However, practicing fiscal policy may be susceptible to structural breaks, resulting in biased tests of public debt sustainability which leads to sustainability rejection. Mencinger, Verbic, and Aristovnik (2015) found these analyses to be more relevant, since there is increased fiscal pressure faced by the governments, with rising public debt to GDP ratios during economic and financial crisis, which are likely to be at higher level during medium term. The interest rates in the long run can also be indicated in a non-linear form. In addition, when the government operations are substantial in size, interest rates will increase in the long run, resulting in the increase in marginal productivity.

There are various means through which economic growth can be affected by public debt. Removing deadweight debt increase the saving incentives for the households (the Pigou-effect), which enables the reduction income taxation at later stage, due to the improvement in saving interest payments, and enterprise and work incentives (Owusu-Nantwi & Erickson, 2016). Saungweme and Odhiambo (2019) suggested that the national debt's gross burden can be partially or completely offset when government expenditure is financed through debt, to contribute to the future generation's real income, e.g. productive public capital formation. In order to cover the impact of public debt, the growth model can be extended with a non-linear impact of public capital on economic growth (Zhang & Sun, 2019). Thus, assuming government debt to be partially used for financing productive public capital, therefore, positive debt effects can be witnessed up to a certain level, after that level negative effects will occur. Mencinger et al. (2015) also suggested that there is scarce empirical evidence available regarding growth and debt relationship, which primarily emphasizes upon external debt's role in developing economies.

Mencinger et al. (2015) attempted to assess per capita GDP growth and gross government debt relationship for developed economies. The study used the case of 24 developed economies for the years 1970-2002 and found no statistical significance between the two. Furthermore, Égert (2015), also analyzed GDP growth rate in the long-run and gross central government's development using a case of 20 developed economies during 1790-2009. The study reported i) a weak relationship among long-term growth and government debt for per GDP ratio which is below 90% of threshold level, and ii) above 90%, there is a 1% fall in median growth rate and more on average.

In a study by Kumarasinghe and Purankumbura (2018), it is analyzed that if domestic borrowing pose crowding out effect on the private sector borrowing during a specified period of time, and found small and short term domestic debt markets with limited investor base. Private sector lending also crowds out significantly through domestic debt utilization. The study suggested that public investment is beneficial to the economy particularly for private sector development. The huge public investment has spill-over effects that require time to provide benefits to the private sector, e.g. infrastructure projects. It is due to the fact that establishing world class communication and transport systems decrease business cost and yield profits. Thus, scarce resources hinder public investment to compete private sector. It is stated that expanding investor base in government securities and robust economic performance significantly increase the domestic debt's maturity profile. The study also explained that the crowding-out generally occurs when there is extensive government borrowing from domestic

market, and the increased demand for investible funds would result in the shortage of funds pushing interest rates upward, leading to a decline in private borrowing which subsequently limit the private investment. However, there are other crowding-out channels. Saungweme and Odhiambo (2019) attempted to analyze the levels of domestic debt in 40 emerging markets and Sub-Saharan African economies, during 1975-2004, and reported significant positive impact of moderate marketable domestic debt (% of GDP) on economic growth.

Baita and Daud (2019) have identified need for financing government expenditures as the reason for a fast-domestic debt increase. However, various government efforts for rationalizing public spending have not been successful, resulting in a continuous rise in the size of domestic debt. Ascending public debt volume is essential for a healthy and strong financial structure. Thus, every government in a market-oriented economy must plan an increase in public debt i.e. no government has a plan of increasing debt in the long-run. It must be noted that a borrowing country automatically gets involved in debt burden is a false view. Chepkemioi and Finance (2014) clarified this false view by stating that indebtedness occurs when a country finds it difficult to repay the debts, where key cost of borrowing is the repayment of interest and the principal amount. He further argued that borrowing arises as a result of increase in development projects by government having no additional amount for financing. Igbodika, Jessie, and Andabai (2016) attempted to investigate the origin of debt problems in Nigeria and found that the 1981 international oil prices collapse, and domestic lapses are partially responsible for the debt problems in Nigeria. Such debt problems may gradually shut down the credit facilities, leading to the obstruction of various projects. In addition, he also advocated the economic growth revival as the most durable and best decision solution for minimizing debt burden. However, factors which may create hindrance in growth achievement includes, external factors and inappropriate limitations arising from the use of domestic policies.

In another study, Cadenillas and Huamán-Aguilar (2016) provided logical reasoning that environment is distinguished by foreign investors' presence (i.e. domestic investors purchasing internationally issued debt and foreign investors who purchase debt that are issued domestically) and open capital accounts. This situation arises when government decides not to absorb but spend, in that case it either issue domestic debt or print money, which implies that domestic debt can be increased by translating aid into debt. He also discussed the developing countries scenario, as the developing economies shift to the domestic debt market in case of difficulty to obtain aid flows or loans from external sources. The researcher also mentioned that issuance of long-term domestic currency debt should not be avoided due to its expensiveness as compared to other financing sources. In fact, various cases are also found in which market creation and insurance benefits that are related to safer debt issuing are worth the price. In addition, Saheed, Sani, and Idakwoji (2015) also explained that central bank while performing its debt management functions significantly plays its role in secondary and primary government securities market. The issuance of government securities is readily guaranteed by Central Bank and absorbs any volume of finance that is not subscribed by the public non-banks and banks in primary market. In case of zero subscriptions of non-central Bank, mandatory take-up ensures the issuance of full amount of treasury certificates, treasury bills and development stocks to the government that are needed for financing the government budget (Policy, 2017).

Central bank also offers secondary market to sell government securities to the public. Besides treasury bonds, all other instruments also possess upper bounds or statutory limits equal to the volume of federal borrowing. In addition, it has argued that the evolution of domestic debt can be analyzed through its size or through analyzing different components. However, the government debt stock is often measured in relation to its national output. Regardless of the small amount of domestic debt as compared to foreign debt, the payments of domestic interest rate significantly burden the budget. Domestic debt has a significant crowd-out effect on the economy's level of private investment. Thus, it is concluded that government debt from internal sources continues to suffer by confidence crisis, since the market participants tend to exhibit unwillingness for longer maturities (Ardagna & Caselli, 2014).

According to Lai, Rethel, and Steiner (2017), the growing demand to finance private sector in the long-term reflects the market that is primarily driven by government debt securities. Financing requirements of corporate

sector has increased to 58% which are financed through sukuk market and debt securities, in comparison to a level of 33% in the last ten years. The financial system sustainability arises as a result of an occurrence of liquid debt securities. In order to enhance the process of price discovery, Thailand has started a mechanism for improving liquidity to ensure efficient market functioning. Modern and comprehensive delivery, settlement system and depository are equally important for facilitating the debt issuance, settlement and trading sukuk and debt securities in the market. In the presence of such structures and mechanisms, the Thailand sukuk and debt securities market is considered to be the largest market having those structures and mechanisms which Central bank implements. Furthermore, the sukuk market and debt securities in Thailand has becoming even more sophisticated and innovative for satisfying investors and issuer's requirements and diverse risk-return profiles.

Those instruments having extended profiles include foreign and local market players. In 2005, Thailand explained that market liberalization is allowed to issue multilateral agencies and foreign corporation's debt securities (Koo & Hong, 2014). It has been further expanded to the denominated issuances of foreign currency in 2007, which has attracted several multinational corporations, multilateral agencies and foreign corporations towards fund raising and investing to originate and issue outside Thailand, thereby strengthening inter-linkages of country's financial market with the international markets and enhancing the market in Thailand. It has been stated that increasing interest in Sukuk and large debt issuance is spurred by the growth of Sukuk market and debt securities and becoming an integral part of the Thailand's financial market.

Thailand being a pioneer of Sukuk market has also become the largest Sukuk issuer, having an outstanding Sukuk of 62% world's sukuk. Thailand is the largest sukuk issuer having competitive and innovative structures. The financial access through financial market has remained unhindered. A financial guarantee insurer has been recently established by Bank of Negara Thailand to offer credit enhancement for the corporations, and for raising finances from sukuk and debt securities market. However, the aim of coordination and collaboration among regulatory agencies is to ensure market robustness and resilience against any shocks and to maintain stability. Sukuk market and domestic debt securities are the key aspects which evolve and continue to meet the investors and businesses changing requirements. The increased foreign and domestic participation contributes to the further market development and will strengthen the economic and financial inter-linkages along other parts of world (Khan, 2016).

3. Data

The present study has examined the domestic debt effects on the economic growth, during 1998-2018. Since domestic debt is considered to be an economic growth stimulator particularly during the period of recession, therefore, its instruments are intended to analyze in this research. The data of variable is gathered from the website of World Bank, international monetary fund and economic intelligent unit.

Estimation

The present study used Vector Autoregressive Model (Castro & Nevárez) approach to test the domestic debt variable using Rafindadi and Ozturk (2017) test, and multivariate co-integration test for analyzing the causal association among economic growth and domestic debt. However, other co-integration tests like Wooldridge (2016), and Issler, Notini, and Soares (2013) can also be used to test the causality but the Johansen Cointegration test has certain desirable properties, such as it treats all test variables as endogenous variables.

Since the data has non-stationary time series properties, therefore, in order to assess the co-integration relation between the variables the long-run association must be considered among different time-series. A given series is integrated of order d if a stationary time series can be obtained by differencing series for d times. After performing data stationary test, Johansen and Juselius (1990) and Johansen (1988) tests were employed to test long-run association between the variable and also involves co-integrating vector tests.

$$Y_t = \Pi_1 Y_{t-1} + \Pi_2 Y_{t-2} + \Pi_3 Y_{t-3} + \Pi_4 Y_{t-4} + \dots \dots \dots \Pi_k Y_{t-k} + \varepsilon_{it} \dots (1)$$

Here, Y_t represents the stochastic variable's $N \times 1$ vector, $\Pi_1, \Pi_2, \dots, \Pi_k$ represents $n \times n$ parameter, and ε_t shows random error term. If the Y_t is stationary, we can write the above equation as follows: $\Pi_1 \Delta Y_{t-1}$

$$Y_t = \Pi_1 \Delta Y_{t-1} + \Pi_2 Y_{t-2} + \Pi_3 Y_{t-3} + \Pi_4 Y_{t-4} + \dots + \Pi_k Y_{t-k} + \varepsilon_{it} \dots (2)$$

Where, $\Pi_i = -[1 - \Pi_1 - \Pi_2 - \dots - \Pi_i]$

$i=1, 2, 3 \dots k-1$

The long-run relationship can be captured among p variables with the matrix Π which can be broken down in matrix A and B , e.g. $\pi = AB$, where A represents vector error-correction parameter and B represents co-integrating vector. Through this, the long-run relationship between GDP, government securities, other loans, and domestic debt can be tested using Equation 1 and 2.

This section involves the formulation of error-correction model. The co-integration tests are performed to investigate whether long-term association exists among the variables, however, it does not indicate the direction of this causation. ECM estimation enables to separate short term responses from the long-term association among economic variables and to discover the direction of long-term Granger causation. In a co-integrated system, the causality is established when the lagged ECT term and sum of lagged coefficients for variables are significant.

Cointegrated series represent the correction mechanism. According to Wooldridge (2016), the possibility of estimated regression to be spurious is ruled out if series are found to be co-integrated due to the occurrence of autocorrelation, endogeneity bias, and omitted variable bias. Since the series in our study are co-integrated, thus, the next step is to determine the causal direction between the variables which calls for the specification of various vector error correction models. Considering the short-run properties of series may offer useful insights for the policy makers. Thus, based on the co-integrating vector, the error-correction model (ECM) is stated as follows:

$$\Delta \ln RGDP_t = \alpha_1 + \sum_a \vartheta_1(i) \Delta \ln TD + \sum_b \theta_1(i) \Delta \ln GpvSec + \sum_c \rho_1(i) \Delta \ln Invl + \lambda ECT_{t-1} + \varepsilon_{it} \dots (3)$$

$$\Delta \ln TD_t = \alpha_1 + \sum_a \vartheta_1(i) \Delta \ln RGDP + \sum_b \theta_1(i) \Delta \ln GpvSec + \sum_c \rho_1(i) \Delta \ln Invl + \lambda ECT_{t-1} + \varepsilon_{it} \dots (4)$$

$$\Delta \ln Invl_t = \alpha_1 + \sum_a \vartheta_1(i) \Delta \ln TD + \sum_b \theta_1(i) \Delta \ln GpvSec + \sum_c \rho_1(i) \Delta \ln RGDP + \lambda ECT_{t-1} + \varepsilon_{it} \dots (5)$$

Where Δ is the first-difference operator, ECT is the error correction term coming from the long-run cointegrating relationship, i.e. residuals, and the terms a, b, c, d is lag lengths. In this parsimonious ECM model, the lag lengths could be equal to zero for the variables that are not also dependent variables.

4. Results

The correlational analysis of the variables is shown in the table 1. The correlation value indicates that the all the variables used in the current study are highly correlated.

Table 1. Correlation

		1	2	3	4
RGDP	1	1			
TD	2	-0.1830	1		
GpvSec	3	-0.5257	0.6483	1	
InvL	4	-0.7810	0.6188	0.8929	1

Table 2. Results from Unit Root Test

Variable	Level	
	Constant	Constant and Trend
RGDP	-1.923419191[0] (0.2364)	-0.631812131[0] (0.2372)
TD	-1.531812131[0] (0.3451)	-0.723234112[0] (0.3723)
GpvSec	-1.739281211[0] (0.4721)	-0.8237162111[0] (0.2364)
InvL	-1.723818011[0] (0.5237)	-2.0352515115[0] (0.8362)

The present study has examined the domestic debt effects on the economic growth, during 1998-2018. Since domestic debt is considered to be an economic growth stimulator particularly during the period of recession, therefore, its instruments are intended to analyze in this research. In a country, the lack of funds may negatively influence economic growth, therefore, most countries like to use external debt to finance its expenditures, such as Thailand. This situation can be improved by focusing on these countries developmental research. In Thailand, the information scarcity regarding domestic debt acts as a policy constraint while designing an effective domestic debt mobilization policy. Thus, the present study predominantly aims to investigate the domestic debt effects on Thailand economic growth. The variables used in this study are extracted from the previous literature and the theoretical framework used in this study. The key variables analyzed are Treasury bills, Government securities, and Investment issues, not forgetting the loans mainly housing loans fund, market loans, issuance of Sukuk Simpanan Rakyat and Sukuk 1 Thailand. We have separated the Government securities into five parts, which was, public sector, social security institutions, insurance companies, financial sector and foreign holders. The purpose of this separation was to analyze better the effects of Treasury bills and Government securities on economic growth. To access the long run estimation, we have used the Johansen cointegration test

The first and foremost in the Johansen cointegration test is that optimal lag length must be determined. The optimal lag length should be such that sufficient to be with white noise. Optimal lag length for obtaining the Johansen cointegration is based on the Vector Autoregressive Model (Castro & Nevárez). Then, lag order is obtained according to the information criteria (Enders, 2004). As vividly seen in Table 2, different information criteria suggested different optimal lag for cointegration. Akaike Information Criterion (AIC) chose two lag while Schwartz Information Criterion (Lučić, Radišić, & Dobromirov) suggested lag one. The two lags as suggested by AIC has been used. The aim is to have parsimonious and best results.

Table 3. Lag Length Selection Criterion

Lag	LogL	LR	FPE	AIC	SC
0	-730.929	NA	4.05e+12	46.058	46.332
1	-624.659	166.047*	5.24e+10*	41.667	43.590*
2	-585.566	46.418	5.58e+10	41.473*	45.046

Note: LR: sequence modified LR test statistics; FPE: final prediction error AIC: Akaike information criterion; SC: Schwarz information criterion HQ: Hannan-Quinn information criterion. * denote choice of lag

Cointegration is all about long run relationship, among at least two variables which are non-stationary. The test for cointegration requires that the variables be integrated of the same order. The Johansen test uses trace test and maximum eigenvalue test determine the number of cointegrating equation.

We have used the Johansen and Juselius co-integration approach to examine the long run relationship while ECM approach was used to see the speed of adjustment in the short run. Furthermore, we have conducted the Lagrange Multiplier test to all variables to check the presence of autocorrelation. The results show that there is no autocorrelation in the variables. For the instrument of Government securities, we have found that all the variables which are financial sector, social security institutions, insurance companies, and financial sector show a statistically significant result in long run analysis.

Dependent Variable:	Model 3	Model 4	Model 5
<i>RGDP_{t-1}</i>		-0.0089** (0.244) **	0.0213*** (0.010)
<i>TD_{t-1}</i>	-0.0198** (0.022)		-0.0328** (0.020)
<i>GpvSec_{t-1}</i>	0.0254** (0.004)	-0.0243** (0.071)	0.0924** (0.010)
<i>InvI_{t-1}</i>	0.0622** (0.076)	-0.0284* (0.075)	
<i>ECT_{t-1}</i>	0.0488** (0.094)	0.0633** (0.008)	0.0921*** (0.000)

Table 4 ECM analysis

On the other hand, short run analysis based on ECM model shows that social security institution, insurance companies, financial sector and foreign holders turn to be significant while public sector show insignificant results. The result for ECM also shows that the model is well adjusted in the short run. For the instrument of GDP, we have found that the Treasury bills, Government securities and Investment issues have a statistically significant effect on economic growth. In ECM model, Treasury bills, government securities, and investment issues turn to be significant. The result for ECM also shows that the model is well adjusted in the short run.

Conclusion

This finding has successfully achieved its objective with the significant variable found to affects the economic growth. All instruments involved in this study exhibit statistically significant results and are in consistence with Saungweme and Odhiambo (2019) findings, which established that economic growth is driven by moderate levels of domestic debt. Furthermore, the present study also reported a linkage among economic growth and debt markets, since domestic debt markets promote financial depth and economic efficiency. Evidence showed an increased vibrancy of the capital market in Thailand in the period. The Lagrange Multiplier also support the argument, which expects that domestic debt may lead to economic growth and confirms that the policies which promotes domestic debt is important in exerting influence on economic growth.

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