PUBLIC DEBT AND ECONOMIC GROWTH IN THE SOUTHEAST ASIA COUNTRIES

Muhammad Ghafur Wibowo

Faculty of Islamic Economic and Business UIN Sunan Kalijaga

gus_fur2001@yahoo.com

Abstract

This study examines the relationship between public debt and economic growth in eight countries in Southeast Asia that are members of ASEAN. Through the study will contribute reference for each country to establish their macroeconomic policies. Using 10 years of data from 2006 to 2015 and analysis tools Vector Auto regression (VAR), the study attempts to test the theory of finance led growth. The main finding of this study is that public debt is actually able to increase the economic growth of a country significantly, although it takes a few years of its existence. This finding supports several previous studies that demonstrate the important role of government debt to the economy of a country.

Keywords: public debt, economic growth, gross domestic product, vector auto regression

Abstrak

Penelitian ini menguji hubungan antara utang publik dan pertumbuhan ekonomi pada 8 negara di Asia Tenggara yang tergabung ke dalam ASEAN. Studi tentang keterkaitan kedua variabel ini akan memberikan panduan bagi tiap negara untuk menentukan arah kebijakan makroekonomi mereka. Menggunakan data 10 tahun dari 2006-2015 dan alat analisis Vector Autoregression (VAR), penelitian berusaha menguji teori finance led growth. Temuan utama dari penelitian ini adalah bahwa utang publik benar-benar mampu meningkatkan pertumbuhan ekonomi negara secara signifikan walaupun membutuhkan waktu beberapa tahun setelah keberadaanya. Temuan ini mendukung beberapa penelitian sebelumnya yang menunjukkan peran penting utang pemerintah bagi perekonomian suatu negara.

Kata Kunci: utang publik, pertumbuhan ekonomi, pendapatan domestik bruto, *vector auto regression*

INTRODUCTION

One of the problems which is being faced by some countries in the management of the state budget is the high expenditure needs than state revenues. In fact, the majority of countries in the world would adopt a deficit budget policy, it means that from the outset of the budget, state spending has been designed to be greater than its income. The consequence of this budget deficit is the creation of the public debt to finance the state budget, debt both from within the country and abroad. Policies owe money for governments to fund the state budget is a customary for many countries.

According to information from the Central Intelligence Agency (CIA) is known that 179 countries in the world has public debt. Japan is a country with the biggest debt ratio and its GDP compared to other countries which is more than 200% (www.cia.gov/library). Table 1 shows the data of 20 countries with the largest accumulated ratio of public debt to GDP in 2015. Several developed countries like the United States, Spain, France and Italy included in the list. This fact shows that the policy / public debt problem is a problem faced by almost all countries, either underdeveloped, developing and developed countries.

Table 1. List of 20 Countries with the Largest Accumulation of Public Debt / GDP

No.	Countries	The Ratio of Debt / GDP	No.	Countries	The Ratio of Debt / GDP
1	Japan	246.14	11	Grenada	107.11
2	Greece	172.73	12	Antigua & Barbuda	106.91
3	Italy	133.76	13	Belgium	106.57
4	Jamaica	132.82	14	Cyprus	105.67
5	Lebanon	131.82	15	United States	105.06
6	Enritrea	129.24	16	Barbados	102.51
7	Portugal	126.35	17	The Gambia	100.01
8	Cape Verde	121.08	18	Spain	99.44
9	Bhutan	115.89	19	Singapore	97.77
10	Ireland	107.75	20	France	97.01

Source: Sumber: http://www.worldatlas.com/articles/top-20-countries-with-the-biggest-public-debt.html accessed Oktober 1, 2016

Countries in Southeast Asia which some of them are members of ASEAN (The Association of Southeast Asian Nations) mostly belong to the group of developing countries. Public debt problems turn out to be faced by all ASEAN countries, even

Singapore which the basis of per capita income is high enough, it has high public debt ratio compared to the GDP (105.6%) and it is ranked 13 in the world. ASEAN countries such as Malaysia, Vietnam, Thailand and Laos have public debt to GDP ratio are in the range of 48%-53% (Table 2). Indonesia is a country that is the ratio of GDP is relatively low compared to other ASEAN countries, which is 27.7% and it is ranked 147 world.

Table 2. Comparison Rating of Public Debt to GDP of ASEAN Countries in 2015

Rank	Countries	(% of GDP)
13	Singapore	105.60
71	Malaysia	53.50
73	Vietnam	52.70
82	Thailand	50.60
86	Laos	48.60
102	Philippines	44.80
132	Cambodia*	33.90
147	Indonesia	27.70

*) Year 2014
Source: https://www.cia.gov/library/publications/the-world factbook/rankor-der/2186rank.html

In macroeconomics, public debt is one component of the fiscal policy section. The government debt is an accumulated value of what the government borrow to finance past deficits. The majority of government debt is in the form of securities with short term rates, such as bills or bonds issued by state agencies (Samuelson and Nordhaus, 1997).

To overcome the budget deficit, the most common way to do is to raise state revenues through taxes or borrow either from the public or other parties through bonds. The debt taken by the government may come from within the country and abroad. Debt is used to finance the government's budget for that year. In the view of economists Classical and Neoclassical, basically there are four factors that affect economic growth, namely (1) the number of inhabitants, (2) the amount of the stock of capital goods, (3) the area of land and natural resources, and (4) the level of technology used (Sukirno 2008). An economy is said to grow when the level of economic activity (production of goods and services) is higher than what was achieved in the past.

One of the factors that play a role in the economic growth is the increasing amount of the stock capital from the financial sector. According to the theory of finance led growth, there are at least four possible approaches that could explain the causal relationship between finance and growth, namely: (1) Finance is the determining factor of economic growth (finance-led growth hypothesis) or so-called supply-leading view; (2) financial follows economic growth (growth-led finance hypothesis) or so-called demand-following view; (3) Interplay between finance and growth, or commonly called the bidirectional causality view; and (4) Finance and growth are not interconnected or so-called "he independent hypothesis.

The first is "the finance-led growth hypothesis" or "supply-leading view". This theory generally assumes that the finance sector that drives economic growth. This theory basically looks for the relationship between finance and economic development. Proponents of this theory believe that the existence of the financial sector that acts as intermediary institutions between the parties that excess capital (surplus units) with those who lack capital (deficit units) will provide resource allocation which is efficient funding that will drive the economic sectors in the growth process.

The second is "the finance-led growth hypothesis" or "the demand-following view". The development of the financial sector follows the economic growth or entrepreneurial activity *(enterprise)* to encourage the growth of the financial sector. If the economy expanded, the demand for banking products and services will also increase, by itself, the banking sector will also increase.

The third is "*the bidirectional causality view*". Schools of economic thought illustrates the relationship a two-way interplay between financial sector development and economic growth. This hypothesis states that a country which has a good financial sector development will encourage a high rate of economic expansion through technological advances and innovative products and services. Then this condition will create a high demand for products and banking services. If the banking institutions respond effectively to the request, then the response will stimulate higher economic performance. The financial sector and economic growth in each interconnected positively and this relationship occurs in both directions. Fourth is "*the

independent hypothesis" or no interplay between finance and economic growth. This hypothesis was introduced by Lucas who believes that the financial sector and economic growth do not have interplay.

This paper aims to examine the relationship between public debt in ASEAN countries to economic growth. The public debt is comprised of debt in the country and abroad of each ASEAN country. This test will prove whether the public debt of each ASEAN country will facilitate economic growth effectively.

METHOD

The object of this study include the Public Debt and Gross Domestic Product (GDP) of member countries of ASEAN. The data used is secondary data, the GDP data obtained from the World Bank National Accounts data, and OECD National Accounts Data Files, while the data of Public Debt is proxied from Total Debt Service values obtained from Worldbank International Debt Statistics.

Quantitative analysis method used in this study is Autoregression Vector models (VAR). VAR models assume that there is no dependence between economic variables with one another (Widarjono, 2016). The steps of the formation of the VAR model is the first to test the unit root (stationary test), then continued with cointegration test, the determination of the long lag, VAR estimation, analysis Impulse Response and Variance Decomposition.

VAR model equations in order to find the relationship between the *Public Debt* and GDP which refers to the model developed by Misztal (2010) are as follows:

$$Ln\_GDP_t = \beta_0 + \beta_1 Ln\_GDP_{t-1} + \cdots + \beta_p Ln\_GDP_{t-p} + \alpha_1 Ln\_PD_{t-1} + \cdots + \alpha_p Ln\_PD_{t-p} + e_t$$

$$Ln\_PD_t = \delta_0 + \delta_1 Ln\_GDP_{t-1} + \cdots + \delta_p Ln\_GDP_{t-p} + \theta_1 Ln\_PD_{t-1} + \cdots + \theta_p Ln\_PD_{t-p} + e_t$$

Where:

Ln_GDP = natural log of Gross Domestic Product (GDP)

Ln_PD = natural log of Public Debt

e = Error Term

Referring to the availability of data, the ASEAN countries which became the object of research are Indonesia, Cambodia, Laos, Malaysia, Myanmar, Philippines, Thailand, and Vietnam (8 countries) in the period of 2010-2015 (10 years). Singapore does not become object of the research because of limited availability of the required data.

RESULT AND DISCUSSION

In VAR analysis method or be referred to the Unrestricted VAR, requires that data must be stationary at the level of the same degree. Therefore, the unit root test was performed to determine the stationary of data.

Table 3. Stationary Test LN_GDP at the *First Difference*

Method	Statistic	Prob**
Null: Unit root (assumes common unit root process)		
Levin, Lin & Chu t*	-6.30369	0.0000
Null: Unit root (assumes individual unit root process)		
Im, Pesaran and Shin W-stat	-2.70774	0.0034
ADF - Fisher Chi-square	37.1166	0.0020
PP - Fisher Chi-square	42.6195	0.0003

Source: Result processed

Table 3 shows that the GDP variable stationary at the first level of differentiation. This is indicated by the value of the probability of the various methods of calculation unit root all of these values are under $\alpha = 0.05$.

Table 4. Stationary Test LN_PD at the *First Difference*

Method	Statistic	Prob**
Null: Unit root (assumes common unit root process)		
Levin, Lin & Chu t*	-5.79329	0.0000
Null: Unit root (assumes individual unit root process)		
Im, Pesaran and Shin W-stat	-4.08176	0.0000
ADF - Fisher Chi-square	50.3188	0.0000
PP - Fisher Chi-square	77.6111	0.0000

Source: Result processed

Table 4 shows that the PD variable stationary at the first level of differentiation. This is indicated by the value of the probability of the various methods of calculation unit root which all values are under α = 0.05.

In the VAR analysis, it is necessary to do the selection of the optimal *lag.* Therefore testing *Lag Length Criteria* in Table 5. Based on the results, it can be seen that the *lag* 6 is a lag optimal because the value of the final prediction error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SC) and Hannan-Quinn information criterion (HQ) are characterized by star sign. Therefore, lag 6 chosen as the optimum lag.

Table 5. Lag Length Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	41.39211	NA	0.000129	-3.282676	-3.184505	-3.256631
1	64.42416	40.30608	2.64e-05	-4.868680	-4.574167	-4.790546
2	71.50535	11.21188	2.06e-05	-5.125446	-4.634590	-4.995221
3	77.22651	8.104974	1.83e-05	-5.268875	-4.581677	-5.086562
4	80.00296	3.470574	2.11e-05	-5.166914	-4.283373	-4.932510
5	89.12028	9.877094*	1.48e-05	-5.593357	-4.513474	-5.306864
6	96.93027	7.159159	1.20e-05*	-5.910856*	-4.634631*	-5.572273*

Source: Result processed

VAR is a system of equations that must be stable. Therefore VAR stability test is performed by using AR Roots. The result of stability testing VAR system using AR Roots shows that VAR system built has stabilized. This is indicated by the value of the modulus of AR Roots whose value is less than 1.

Table 6. VAR Stability Test (AR Roots)

Root	Modulus
-0.967463	0.967463
-0.670563 - 0.684552i	0.958262
-0.670563 + 0.684552i	0.958262
0.939567	0.939567
0.430132 - 0.761832i	0.874872
0.430132 + 0.761832i	0.874872
0.079608 - 0.817258i	0.821126
0.079608 + 0.817258i	0.821126
-0.520463 - 0.474902i	0.704566
-0.520463 + 0.474902i	0.704566
0.641544 - 0.238085i	0.684298
0.641544 + 0.238085i	0.684298

Source: Result processed

The next test is granger causality test. The test is to see whether there is a reciprocal relationship between GDP and PD. Based on Granger Causality Test, the probability of the first hypothesis nor the second value of Null are greater than α = 0.05. Therefore it can be concluded that PD and GDP do not have a causal relationship.

Table 7. *Granger Causality Tests*

Null Hypothesis:	Obs	F-Statistic	Prob.
LN_PD does not Granger Cause LN_GDP	64	1.23577	0.2980
LN_GDP does not Granger Cause LN_PD		2.95204	0.0600

Source: Result processed

Unrestricted VAR requires that each variable should have no cointegration relationship. If each variable has a cointegration relationship, then the proper analysis is used is not Unrestricted VAR, but VECM (Vector Error Correction Model) or it could be called restricted VAR. Therefore co-integration test is performed as follows:

Table 8. Johansen Fisher Panel Cointegration Test

| Hypothesized No. of CE(s)	Fisher Stat.* (from trace test)	Prob.	Fisher Stat.* (from max-eigen test)	Prob.
None	11.09	0.8039	11.09	0.8039
At most 1	1583.	0.0000	1583.	0.0000

Source: Result processed

From the cointegration test results, it can be seen that the probability of the hypothesis "*None*" is greater than 0.05 and "*At Most 1*" is smaller than α = 0.05. Therefore it can be concluded that between GDP and PD variables have no cointegration relationship. Then a suitable analysis tool used is Unrestricted VAR in Difference (because the data is stationary at the first level of difference)

Impulse Response Function gives an overview of how the response of variable in the future if there is interference on other variables. Impulse Response Function can provide information on how the response of each variable to shock coming from the variable itself as well as a shock coming from other variables. The test results of Impulse Responses to GDP and PD variables in Figure 1.

Figure 1. Impulse Response of Public Debt (PD) to GDP
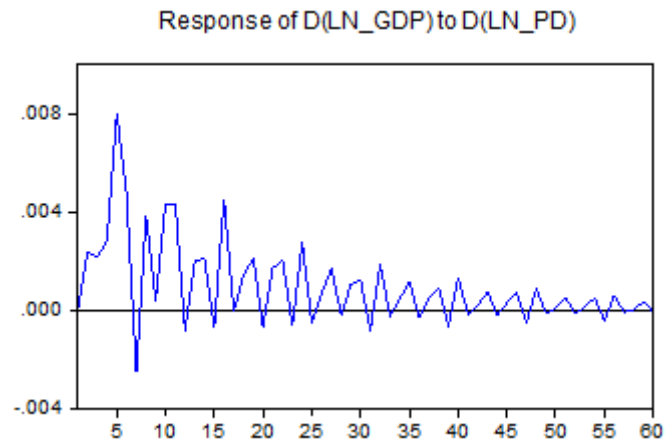
Source: Result processed

Based on Figure 1 above, it can be understood that the *shock* variable of Public Debt (PD) causes the variable GDP rises very high at the beginning of the period to the fifth period. Then in the sixth period declines sharply up to a period of eighth to seventh. In the eighth period rises again and then fluctuates and slowly gets closer to zero or towards the stable point. This means that government debt in many ASEAN countries have a very significant influence on economic growth. The influence of the debt is not very visible in the period of 1 or 2 years after the debt but takes about 4-5 years (time lag). These findings confirm the findings of several previous studies, such as Siddiqui and Malik (2001) for the case in South Asia and Al-Refai (2015) in the case in Jordan.

Figure 2. Impulse Response of GDP to Public Debt (PD)
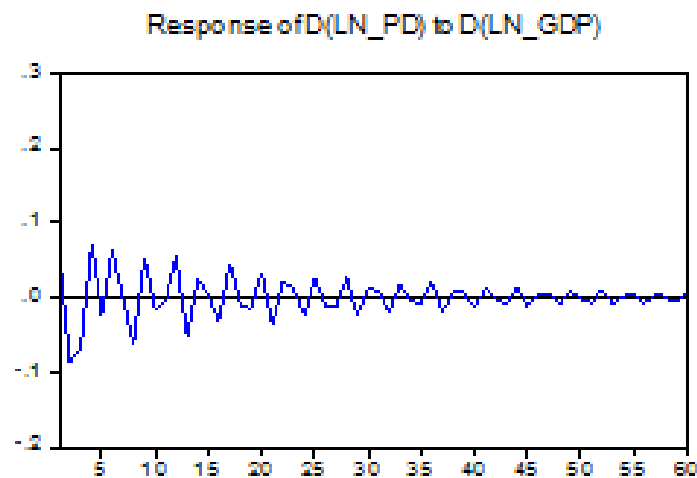
Source: Result processed

The shock of GDP variable causes the Public Debt (PD) variable decreased at the beginning of the period to second period. Then in the third period rises up to the forth period. In the fifth period goes down again and then fluctuates and slowly gets closer to zero or towards stable point. The achievement of high economic growth did have an impact on the desire of the state to raise capital for development, but the impact is relatively small, not for the influence of Public Debt to GDP. The hypothesis of the financial sector following the economic growth (growth-led finance hypothesis) is not sufficiently proven in this case.

Table 9. Variance Decomposition

Period	Varince Decomposition of D(LN_GDP)			Period	Variance Decomposition of D(LN_PD):		
	S.E.	D(LN_GDP)	D(LN_PD)		S.E.	D(LN_GDP)	D(LN_PD)
1	0.007674	100.0000	0.000000	1	0.299288	3.950574	96.04943
2	0.009050	93.10788	6.892122	2	0.356047	8.681451	91.31855
3	0.009966	89.69381	10.30619	3	0.362578	11.72616	88.27384
4	0.010620	83.83576	16.16424	4	0.369770	14.81480	85.18520
5	0.013712	56.38039	43.61961	5	0.373349	14.90433	85.09567
6	0.014605	50.83407	49.16593	6	0.394763	15.90000	84.10000
7	0.014973	50.37371	49.62629	7	0.397493	15.70355	84.29645
8	0.015552	47.92709	52.07291	8	0.418432	16.46302	83.53698
9	0.015678	48.70089	51.29911	9	0.444282	16.00450	83.99550
10	0.016298	45.53612	54.46388	10	0.464635	14.73156	85.26844
11	0.016952	43.07338	56.92662	11	0.469399	14.43820	85.56180
12	0.017041	43.43242	56.56758	12	0.474413	15.46670	84.53330
13	0.017178	42.99389	57.00611	13	0.478809	16.32956	83.67044
14	0.017390	42.86781	57.13219	14	0.481216	16.42120	83.57880
15	0.017404	42.80509	57.19491	15	0.481551	16.40848	83.59152
16	0.018055	40.58761	59.41239	16	0.490998	16.19589	83.80411
17	0.018056	40.59673	59.40327	17	0.507816	15.94859	84.05141
18	0.018112	40.35800	59.64200	18	0.513862	15.61902	84.38098
19	0.018289	40.18779	59.81221	19	0.516089	15.56211	84.43789
20	0.018307	40.16436	59.83564	20	0.517453	15.88013	84.11987

Source: Result processed

In the first period, GDP variance explained by the variable itself amounted to 100%. But in the second period, GDP variance explained by the variable itself amounted to 93.1%, while the remaining 6.9% is explained by the PD variable. In the third period the GDP variance explained by the variable itself amounted to 89.7%, while the remaining 10.3% is explained by the PD variable. It can be concluded that, the contribution of PD to GDP is likely to increase. Meanwhile, on the right, in the first period, PD variance explained by the variable itself is 96%. But in the second period, PD variance explained by the variable itself amounted to 91.3%, while the remaining

8.7% is explained by the variable GDP. In the third period, PD variance explained by the variable itself amounted to 88.3%, while the remaining 11.7% is explained by GDP.

Findings in various countries and regions indeed show the results which are not always the same, that the public debt is always a positive influence on economic growth in the country. Misztal (2010) finds that debt in the countries of the European Union has a negative impact on economic growth. Similarly, Mencinger et.al (2014) who observed the European countries increased their public debt always turns out negatively negatively impact its growth. Babu et al. (2006) also found a negative relationship between debt and economic growth in East Africa countries. Therefore, the policy of increasing or reduction of public debt should be based on the analysis that is tailored to the circumstances faced. In the context of the ASEAN countries, the debt proved to have a positive impact on economic growth. This shows that the management of public debt in the ASEAN region in accordance with the purpose of its use. However, each additional new debt must be in accordance with each country's ability to pay back, in both the short and long term.

In the long run, the public debt is not a solution for supporting economic growth. Although the short and medium trem goverment debt could encourage economic growth, in teh long run public debt must be lowered. High economic growth provides sufficient capital for the next period, so a dependence of goverment debt may be reduced (Bittencourt, 2012).

CONCLUSION

Granger causality test shows no causal relationship between the public debt (PD) and economic growth (GDP) in the ASEAN countries. These results show results in the short term, while in the long run the variables show a close relationship. Public debt variable shows a positive and significant effect in increasing the GDP but it takes a few years. The lag of time is a natural thing in the process of economic development of the country. The findings of this study confirm the theory of finance led growth hypothesis that demonstrate the role of the financial sector, including government debt to boost economic growth. The success of the course is the result of a good public debt management in

each country. The policy of increasing public debt implicates increased the country financial funding that will encourage economic growth.

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