# The Impact of Government Debt and Macro Variables on Economic Growth of Myanmar, Cambodia, Laos PDR and Bangladesh

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**ABSTRACT**

This study examines the impact of government debt and macro variables on economics growth of Myanmar, Cambodia, Laos PDR and Bangladesh which are listed in the Least-Developed-Countries by using ARDL. In this empirical research, dependents variable is GDP and independent variables are government debt (GDEBT), inflation (INF), exchange rate (EX) and current account balance (CA). The research methodology consist three steps which are Levin, Lin & Chu, ADF unit root test and PP unit root test, ARDL approached Pooled Mean Group estimation. The study of empirical results is significant at 1% and 5% in the short run and long run. It is found that the government debt strongly impacts the economic growth: the results in this research of the study which the government debt and macro variables have the effective both positive and negative impact on economic growth during the period 2001-2015.

Keywords: Myanmar, Government Debt, Exchange Rate, Inflation, GDP and Current Account Balance
JEL Classification: C24, C51, E31,F31, F32, H63

## 1. Introduction

In four least developed countries; Myanmar, Laos PDR, Cambodia and Bangladesh, the governments have to take loans respectively from the World Bank (WB), the International Monetary Fund (IMF), the Organization for Economic Co-operation and Development (OECD) so as to fulfill their revenue for coming fiscal year as the governments gets deficit in some sectors on the basic of financing; budget deficit and monetized deficit and on the basic of the type of transaction; primary deficit, revenue deficit and effective revenue deficit.

The government debt is not a burden at all for the Least Developed Countries (LDCs). Nevertheless, the governments can inject the loan (as capital) again to the aggregated economy of Myanmar, Cambodia, Laos PDR and Bangladesh under the intervention programs so as to increase the productivity of the countries. And the interest can be raised by driving the whole economic mechanism in terms of the loan (as capital).If so, what is the problem of having the

loans from the international financial institutions such the World Bank, the International Monetary Fund (IMF) and the Organization for Economic Co-operation and Development (OECD), the Paris Club and so forth? The only problem for the Least Developed Countries is that the countries cannot give back the debt to the international financial institutions. The debt burdens become heavy, and on the other hand, the deficit in the countries' current account balance (% of GDP) was resulted more or less. It seems the countries cannot give back the loans and the international financial institutions cannot offer more loans those countries under the procurement regulations for borrowers. Hence, the government debt pull down the respective country's economy or it causes the stagnation in aggregated economies.

This research is to support the empirical research the Least Developed Countries (LDCs) with a heavy burden of government debt. Since, Myanmar, Cambodia, Laos, and Bangladesh were chosen to do a research on the impact of government debt on economic growth. Laos PDR and Bangladesh share the borders with Myanmar except Cambodia: but it shares the region in the ASEAN, thereby economic welfare is the most crucial for those border-sharing-countries, hence other issues such as migrations, illegal narcotics-poppy trading in the golden triangle area, and some criminal cases in relations to illegal migrant-workers, the internal conflicts flaring in accordance with illegal weapon trade along the borders. Keeping the government debt stable (one of the ways that will be mentioned in next chapters) would encourage the economic growth. By an effort of economic growth, the issues which are caused due to being not rich enough for living will be reduced more or less.

**Myanmar**

Myanmar is remained at low risk of distress of debt. The government debt indicators are below their thresholds. In the long term, it will rise. While the risk of Myanmar debt distress is characterized low, close monitoring is required, in particular because of potential or both domestic and external downside risks to materialize that might affect the debt level. The Myanmar government debt sustainability analyses are based on the DSA framework.

**Table 1:** Key Macroeconomic Assumption Underlying the DSA for the Baseline Scenario (FY2015/16 – 2035/36)

| | Current DSA | | Previous DSA | |
|---|---|---|---|---|
| | Medium Term | Long Tern | Medium Term | Long Term |
| | 2015/16–020/21 | 2021/22 – 2035/36 | 2014/15–019/20 | 2020/21 – 2034/35 |
| Real GDP growth (%) | 8.1 | 6.8 | 8.1 | 6.6 |
| Inflation (%) | 9.1 | 4.7 | 6.3 | 4.0 |
| Overall fiscal balance (% of GDP) | -4.5 | -4.2 | -4.6 | -3.8 |
| Noninterest current account (% of GDP) | -7.3 | -4.4 | -4.7 | -3.3 |
| Revenue (nonfinancial public sector, % of GDP) | 21.3 | 23.8 | 24 | 25 |

Source: IMF staff estimates

**Cambodia**

The debt of Cambodia rating remains low with all debt burden indicators projected to remain below the particular thresholds. The sustainability keeps being vulnerable to growth, exports, fiscal shocks, and the materialization of contingent liabilities, and it calls to continue reforming structure to increase the resilience of economy against external shocks, and to mobilize fiscal revenues.

**Table 2:** External Public Debt of Cambodia

| | U.S dollar (millions) | Share of total External Debt | In percent of GDP |
|---|---|---|---|
| Total | 5,483.5 | 100.0 | 33.1 |
| Multilateral | 1,696.8 | 30.9 | 10.3 |
| Bilateral | 3,786.6 | 69.1 | 22.9 |

Source: Cambodia authorities; and World Bank estimates

**Laos PDR**

Facing external debt distress, the risk of Lao P.D.R. remains moderate, however it is on the cusp of a transition to high risk, with heightened vulnerabilities for public debt. Given the considerable share of foreign currency denominated debt, large and unexpected exchange rate depreciation could raise the debt-to-GDP and the debt service-to-revenue trajectories for external and public debt even though revenues of large resource projects are to ease risks in the long term. While external risk change is not necessary at this time because baselines breaking the thresholds under both the traditional and probability approaches are minor and temporary, the breaches suggest vulnerabilities, which should be addressed through fiscal consolidation by strengthening public investment management capacity.

**Table 3:** External PPG debt indicators of Laos PDR

| | U.S dollar (billion) | Share of total PPG External debt (%) | In percent of GDP |
|---|---|---|---|
| Total | 5.1 | 100 | 48 |
| Multilateral | 1.8 | 36 | 17 |
| Bilateral | 3.3 | 64 | 31 |
| Commercial | 0.1 | 3 | 1 |

Source: Laos RDR authorities; and IMF World Bank estimates

**Bangladesh**

Bangladesh is at a low risk of external public debt distress. In the absence of a permanent boost to revenues, the public debt trajectory would become unsustainable.

As of the end of FY15, total public sector and public sector-guaranteed external nominal debt amounted to 26 billion USD which was 13% of GDP. The World Bank and the Asian Development Bank are the two largest creditors, with outstanding loans of US$12 and US$7 billion, respectively. The largest bilateral creditor is Japan, with outstanding loans of US$2 billion

## 2. Literature Review

Literature review is important to guide statement of hypotheses, determine an appropriate methodology and to understand the measurement of variables in the analysis of this nature. In this regard, this chapter analyses the theoretical framework underlying growth effects of public debt as well as empirical works. An analysis of the different methodologies applied in the econometric analysis of public debt and economic growth was also given consideration under this chapter.

### The relationship between the government debt and economic growth

In economic theory, at moderate levels of government debt, following typical Keynesian behavior, fiscal policy may induce growth. The classical economic view argues that government debt (manifesting deficit financing) can induce growth by stimulating aggregate demand and output in the short run. Moderate levels of debt are found to have a positive impact on economic growth through a range of channels: improved monetary policy, strengthened institutions, enhanced private savings, and deepened financial intermediation. Government debt could be used to smoothen distortionary taxation over time. Barro's model predicts that debt responds to the temporary deviation in income or government expenditure and hence, in the absence of aggregate uncertainty, debt would be constant and equal to its 'initial 'level. Expansionary fiscal policies that lead to debt accumulation are argued to have a positive effect on both short- and long term growth (DeLong and Summers 2012). In a theoretical model integrating the government budget constraint and debt financing, Adam and Bevan (2005) find increase in

growth during low debt levels as they observe interaction effects between deficits and debt stocks, with high debt stocks exacerbating the adverse consequence of high deficits.

Historically, the theoretical literature argues that growth models amplified with governments issuing debt to fund consumption or capital goods tend to exhibit a negative relationship between government debt and economic growth. Modigliani (1961) argues that Government debt is a burden for posterity, which results in waning flow of income from a reduced stock of private capital. It is argued that government debt crowds out capital and leads to a slowdown of output in the long run.

Both the neoclassical and endogenous growth models inform of the negative effect of government debt on long-run growth. Government debt could have a substantial adverse effect on economic outcomes if it affects the productivity of public expenditures. Analyzing the impact of fiscal policy, peroxided inter alia by the level of government debt, in endogenous growth models, Aizenman et al. (2007) find a negative relationship. While standard growth theory advocates that an increase in government debt (due to a fiscal deficit) leads to slower growth, the neoclassical growth theory suggests a temporary decline in growth along with the transition path to a new steady state. However, the endogenous growth theory suggests a permanent decline in growth as the debt increases.

Several studies report a negative non–linear correlation between government debt and economic growth in advanced and emerging market economies. There is growing evidence that government debt is negatively correlated with economic growth, and very few studies make a strong case for a causal relationship going from debt to growth. (Swamy 2015)

**Theoretical Literature**

Conventional view of public debt based on the neoclassical setting informed theoretical literature analysis in this study. According to the neoclassical theories, Adam & Bevan say that the growth models are augmented with variables depicting issuance of debt to finance government expenditure which include both consumption and capital goods (Adam & Bevan, 2005). Analysis of such models tends to depict a negative relationship between public debt and economic growth. Besides, Cordella claims that the argument for this conclusion is well explained using the crowding in/out and debt overhang hypotheses as some empirical studies have done (Cordella et al, 2005). The theoretical arguments of crowding in/out and debt overhang effects of public debts are thus discussed as follows.

**Debt Overhang Hypothesis**

The adverse effect of public debt stock on economic growth has largely been explained by debt overhang hypothesis (Krugman 1988). Krugman, thus defines debt overhang as a situation in which investments are reduced or postponed since the private sector anticipates that the returns from their investment will serve to pay back creditors. Implying that, the expected future public debt service of a country is likely to be an increasing function of the Country's output level. Therefore, huge accumulation of public debt stock creates uncertainty behavior among investors on the actions and policies that the Government will adopt to meet its debt service obligations. In this regard, Krugman (1988) contends that most potential investors will assume that Government will finance its debt service obligations through distortionary tax measures, thus they will adopt a wait and see attitude which will affect private investments and therefore economic growth.

Isu also agrees empirical evidence to support the above theoretical arguments advanced by Krugman (1988) can be found in studies undertaken by various scholar namely; (Ezeabasii, Isu et al. 2010).

Theoretically, Rishi argues that a high level of public debt can have adverse consequences on the macroeconomic stability, discouraging capital inflows while favoring capital flight (Cerra, Rishi et al. 2008)

Focusing on the interaction effects of deficits and debt stocks, Adam and Bevan argue that a high debt stock exacerbates the adverse consequences of high deficits. Using a simple theoretical model integrating the Government budget constraint and debt financing, the study found that an increase in productive Government expenditure, financed out of a rise in the tax rate, will be growth-enhancing only if the level of public debt is sufficiently low(Adam and Bevan 2005).

**Methodology approach to analysis of growth with effect of government debt**

Choice and application of methodology in econometric analysis relating to time series data and the objective of the study is of particular importance. Notable estimation techniques employed in the analysis of growth effects of debt include, the Ordinary Least Squares (OLS), Instrumental Variables & Generalized Methods of Moments and the Vector Auto-Regressive (VAR) framework. The methodologies cited here have their own weaknesses and strength when it comes to choosing the appropriate model especially for studies like this one. An in-depth

understanding of the estimation technique to guide this research was therefore important. The discussion of the above cited estimation techniques are presented below.

**Autoregressive Distributed Lags (ARDL) Model**

ARDL cointegration technique does not require pretests for unit roots unlike other techniques. Consequently, ARDL cointegration technique is preferable when dealing with variables that are integrated of different order, I(0), I(1) or combination of the both and, robust when there is a single long run relationship between the underlying variables in a small sample size. The long run relationship of the underlying variables is detected through the F-statistic (Wald test). In this approach, long run relationship of the series is said to be established when the F-statistic exceeds the critical value band. The major advantage of this approach lies in its identification of the cointegrating vectors where there are multiple cointegrating vectors. However, this technique will crash in the presence of integrated stochastic trend of I(2). To forestall effort in futility, it may be advisable to test for unit roots, though not as a necessary condition. Based on forecast and policy stance, there is need to explore the necessary conditions that give rise to ARDL cointegration technique in order to avoid its wrongful application, estimation, and interpretation. If the conditions are not followed, it may lead to model misspecification and inconsistent and unrealistic estimates with its implication on forecast and policy. ("Autoregressive Distributed Lag (ARDL) Cointegration Technique: Application And Interpretation")

## 2. Methodology

**Research Design**

The methodology of the paper mainly relies on ARDL approach to co-integration. These processes are used to study the relationship between macroeconomic performances including foreign direct investment (FDI), GDP per capita (GDPPC), Export (EXP) and labor force (LF) in both short-run and long run. The time series econometrics methods namely Augmented Dickey Fuller (ADF) unit root test, Philips-Perron (PP) unit root test, Autoregressive Distributive Lag (ARDL) test, F-test, Error Correction Model (ECM) tests and diagnostics tests are adopted in this research study to know whether there exist the short run and long run

relationship of macroeconomics performances. The combination of unit root test using ADF test, PP test and ARDL approach to co-integration was introduced to test the hypothesized relationships covering data for the 15 years from 2001 to 2015 in Myanmar, Cambodia, Laos PDR and Bangladesh.

The stationary test was carried out under ADF and PP test to check whether the variables that used in this research are stationary or not. The output results indicate the order of stationary at I (0) and I (1). Autoregressive Distributive Lag (ARDL) is a suitable approach for the mixed order united root test to do the research that has small samples and testing long-run and short-run relationships. ARDL takes in the form as follows:

$$yit = \sum_{j=1}^{p} \lambda_{ij} Y_{it-1} + \sum_{j=0}^{q} \delta_{ij} X_{it-j} + \mu_i + \varepsilon_{it}$$

The ARDL approach model will also provide an alternative test for examining the significance of the impact of macro forces composition including gross domestic product (GDP), current account balance (CA), exchange rate (EX) and inflation (INF) in Myanmar, Cambodia, Laos PDR and Bangladesh.

The result is taken to be figure out an appropriate estimator. The data is estimated under the Pooled Mean Group Estimator, the Mean Group Estimator, and the Hausman Test.

**Pooled Mean Group Estimator**

Pooled mean group (PMG) is an estimation method based on both pooling and averaging and estimates the long-run and short-run correlation with one equation. The estimator allows error variances, intercepts and short-run coefficients to differ freely across countries while long-run coefficients remained constant across groups.

The main feature is that the responsiveness of cointegrated variables can have any deviation from long-rum equilibrium. Therefore, this deviation from equilibrium influenced on short-run dynamics of variables and thus error correction model needs to apply.

$$\Delta y_{it} = \phi_i (y_{it-1} - \theta' X_{it}) + \sum_{i=1}^{p-1} \lambda_{ij}^{*} \Delta y_{it-1} + \sum_{j=0}^{q-1} \delta_{ij}^{*} \Delta X_{it-j} + \mu_i + \varepsilon_{it}$$

**Mean Group Estimator**

The estimation gives the averaged estimates of parameters but this does not considered that certain parameters can be in same group. MG estimator allows that intercepts, error variances and slope of coefficient vary across countries. The method discussed by **(Pesaran and Smith 1995)** mentioned that panel data has small (T) and large (N). Estimation of long run parameter's coefficient can be written as:

$\hat{\beta} = N^{-1} \sum_{i=1}^{N} \widehat{\beta i}$

**Hausman Test**

Hausman test is used to determine the best estimation to choose among PMG and MG. The test statistic is described by $\lambda 2$.

$H = (\hat{\beta}_b - \hat{\beta}_B) D^{-1} (\hat{\beta}_b - \hat{\beta}_B)$

$D^{-1} = (V\hat{\beta}_b - V\hat{\beta}_B)$ which is generalized inverse

$V\hat{\beta}$ is the variance of coefficient

H0: Accept PMG if p value of $\lambda 2 > 0.05$

HA: Reject MG if p value of $\lambda 2 < 0.05$

## 3. Empirical Result

**Levin, Lin & Chu test, Augmented Dicker-Fuller test and Phillip-Peron Unit Root Test**

The standard unit root test namely Levin, Lin and Chu test, Augmented Dicky-Fuller (ADF) test and Phillip-Perron test were applied to determine the degree of stationary of the variables used in the model. The test was conducted with intercept and trend specification. Table 4 shows the computed results of time series data namely gross domestic product (GDP), current account balance (AC), exchange rate (EX), inflation (INF) and government debt (GDEBT)

Table 4: United Root Test result

| | Levin, Lin & Chu | | ADF test | | PP test | |
|---|---|---|---|---|---|---|
| | Level | 1st difference | Level | 1st difference | Level | 1st difference |
| GDP | -1.95769 ( 0.0251)* | -2.70243 (0.0034)* | 13.6881 ( 0.0903) | 18.5220 ( 0.0176)* | 7.83603 (7.83603) | 34.8768 (0.0000) |

| | | | | | | |
|---|---|---|---|---|---|---|
| CA | -1.18458 ( 0.1181)* | -6.85070 (0.0000)* | 9.07866 ( 0.3357)* | 35.3933 (0.0000)* | 11.6452 ( 0.1677)* | 53.3619 ( 0.0000)* |
| GDEBT | -3.82020 ( 0.0001)* | | 17.9897 (0.0213)* | | 29.8802 (0.0002)* | |
| INF | -6.12964 (0.0000)* | | 23.7859 (0.0025)* | | 22.7853 (0.0037)* | |
| EX | -1.45417 ( 0.0729) | -3.27436 (0.0005)* | 9.88156 ( 0.2734)* | 18.8136 ( 0.0159)* | 12.2501 ( 0.1404)* | 26.2544 ( 0.0010)* |

*the value of probability

Source: Author

The probability of t-statistics is significant at level of 1% and 5%. By the result of the unit root test the data of GDP, CA, and EX are stationary at the 1st different level by individual intercept under Levin, Lin and Chu test which probability value are 0.0034 (GDP), 0.0000 (CA) and 0.0005 (EX), ADF test which probability value are 0.0176 (GDP), 0.0000 (CA) and 0.0159 (EX) and PP test which probability value are 0.000 (GDP), 0.0000 (CA) and 0.0010 (EX). Nevertheless, GDEBT and INF are stationary at the level under the same unit root test which probability values under the Levin, Lin and Chu test are 0.0001 (GDEBT) and 0.0000 (INF), under ADF test are 0.0213 (GDEBT) and 0.0025 (INF) and under PP test are 0.0002 (GDEBT) and 0.0037 (INF). Hence, the macro variables are stationary at mixed order. The result of unit root test is approached to the panel ARDL approached Pooled Mean Group and Dynamic Effect.

**Pooled Mean Group Estimator**

Pooled Mean Group Estimator is the most appropriated for ARDL method. The results for long term and short term are exhibited.

Fig 5: Pooled Mean Group Estimator result for Long term cointegration under ARDL method

Panel Variable (i): Countrynum
Time Variable (t): Yr

Number of obs = 56
Number of groups = 4
Obs per group: min = 14
avg = 14.0
max = 14
Log Likelihood = -43.66701

| GDP | Coef | Std.Err | z | P>\|z\| | 95% Conf. Interval | |
|---|---|---|---|---|---|---|
| Inf | -.504418 | .1102066 | -4.58 | 0.000 | -.7204189 | -.288417 |

| | | | | | | |
|---|---|---|---|---|---|---|
| EX | -.0038629 | 0012299 | -3.14 | 0.002 | -.0062735 | -.0014523 |
| CA | -.0903682 | .0650113 | -1.39 | 0.165 | -.2177879 | .0370515 |
| Gdebt | .3914882 | .0857212 | 4.57 | 0.000 | .2234777 | .5594988 |

Source: Author's calculation

For the inflation, there is significantly correlation between GDP and INF; means the up and down of inflation will impact the economic growth definitely owing to the significant probability value 0.0000. If the exchange rate increases, the economic growth in measure of GDP will increase. The correlation between GDP and exchange rate is proved by the value of probability value 0.002. The main research of government debt is highly impact the economic growth. Current account balance has positive relationship with economic growth, but the CA slightly correlates to GDP. All are taken under the 5% probability value acceptance in long term.

Fig 6: Pooled Mean Group Estimator result for short term cointegration under ARDL method

| GDP | Coef | Std.Err | z | P>\|z\| | 95% Conf. Interval | |
|---|---|---|---|---|---|---|
| Inf | .0477705 | .0594873 | 0.80 | 0.422 | -.0688225 | .1643636 |
| EX | .0331335 | .0351964 | 0.94 | 0.347 | -.0358502 | .1021172 |
| CA | .1021172 | .1869537 | -1.15 | 0.251 | -.5812057 | .1516395 |
| Gdebt | -.2225947 | .2054185 | -1.08 | 0.279 | -.6252076 | .1800183 |

Source: Author's calculation

Owing to the result, the probability value of inflation, exchange rate, government debt and current account balance is over the 10% probability acceptance with the values; 0.422, 0.347, 0.251, 0.279 respectively. So there is no correlation between inflation, exchange rate, government debt and GDP in short term.

## 4. Conclusion

According to empirical analysis, in the lest development countries in sample of Myanmar, Cambodia, Laos PDR and Bangladesh, government debt, inflation, exchange rate, and current account balance have positive relationship with GDP: the impact of government debt and macro variables on economic growth is too serious in long run. Almost every lest-development-countries take loans from international financial institutions. That is not a barrier for economic growth, nevertheless the LDCs could not keep the money assets in the market after taking loans which causes the inflation. That situation leads to money depreciation. In a years after the year taking loans, the government debt become burden gradually. So that, the contribution suggests that the respective governments of LDCs should be good at debt management.

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