Saving-Economic Growth Nexus in Myanmar: Co-integration and Causality analysis

Zaw Htet Pine[1]

Abstract

Savings are important at both Micro and Macro level of a country. Increased Saving of people raises the economic growth and encourages investment source for the development of economy. This paper aimed at investigating causal relationship between gross domestic saving and economic growth (measuring with GDP in general sense) and identifying this relationship is unidirectional or bidirectional in Myanmar. And it is to test fitting of Solow's model and Keynes's theory for Myanmar. The study covers the period (1961- 2018). Methodology is based on the econometrics analytical approach to evaluate two -variable relationship by employing Augmented Dickey-fuller test, co-integration, Vector Error correction model and causality techniques. The study found that saving has a positive impact on economic growth in the long-term and Solow's model is consistent with Myanmar.

Key words: Saving, Economic growth, Gross Domestic Product, Vector Error correction model, Keynes's theory, Solow's model

INTRODUCTION

Domestic savings are very crucial for the economic development of countries because investments come from savings. Savings is output of resources which have been unconsumed in current year and available for future periods. Saving is one of the important indicators of economic development where it is used to achieve economic growth in any developing country. Although there are lots of factors effecting economic growth (for example, technology, human capital, natural resource, entrepreneurship, market efficiency and international trade etc.), saving has pivotal role to play in driving engine of economic growth via direct investment according to Harrod-Domar Model . Myanmar, a developing country has a reasonable growth rate among developing countries (The World Bank,2018).

A country's economic growth is its capacity to increase production of goods and services compared to its previous period. Economic growth is a key macroeconomic concept of interest among researchers and policy makers all over the world. Macroeconomic indicators stem from its critical role in effecting other integral part of economy and livelihoods. If a country grasps long-term growth, it will have a positive impact on national income and the level of employment, which increases the standard of living.

[1] Lecturer, Department of Economics , Co-operative University, Thanlyin

Higher economic growth also leads to greater tax income for government spending, which the government can make a greater expenditure to develop the economy. This expansion can also be used to reduce the budget deficit. Additionally, if the population growth of a country goes up, it requires growth to meet its standard of living and wealth. Because saving is very important for economic growth, this study focuses on saving and economic growth relationship in Myanmar.

RATIONALE OF STUDY

The causal relationship between saving and economic growth has caught global attention among researchers and policy makers from both developed and developing countries in the last decades. Robert Solow (1956)'s neo-classical growth model postulates an explicit link between saving and economic growth. Higher saving gives rise to higher investment, which in turn leads to higher economic growth. Therefore, this makes strong macroeconomic policy recommendations for development in many countries. And investigation of the significant relationship between saving and economic growth plays an important part due to its useful information for government and related authorities can control the targeted variables or variables in order to attain desired level of growth.

Therefore, the current paper tries to examine the causal relationship between domestic saving and economic growth for Myanmar using Augmented Dickey- Fuller test for Unit root, Co-integration technique, Vector error correction model and causality test.

LITERATURE REVIEW

In the econometric literature, a number of studies have been conducted to analyze the relationship between savings and economic growth in many developing countries. Increased savings stimulate economic growth through increased investment (Bebczuk 2000). This approach is recommended by Harrod (1939), Domar (1946) and Solow (1956) growth models. Also outcomes of empirical research by Alguacil, Cuadros and Orts (2004) as well as by Singh (2009) provide support for the hypothesis that increased savings promote economic growth. Economic growth theories postulate that the dynamics of the country's economic growth increases if the investment in human or material capital or in scientific research and development (R&D) grows.

Higher domestic savings led to higher investment and therefore contributed to higher rate of economic growth in 32 countries (Krieckhaus).Abu(2010) investigated the relationship between savings and economic growth in Nigeria applying Granger causality technique and co-integration, concluding there was long-run equilibrium relationship between them. It was found that the benefits of savings have a great impact on economic growth(Harrod,1939;Solow,1956;Oladipo,2010;Roman,2005;Jappelli&Pangano,1994;Aghion,Comin,Howitt,&Tecu,(2009) while (Sinha,1998&2008; Abu,2010; Ijeoma, Paramaiah,& Moshoshoe,2011) confirmed causality runs from economic growth to saving. But Keynesian model stressed that growth of output (income) causes increase in saving.

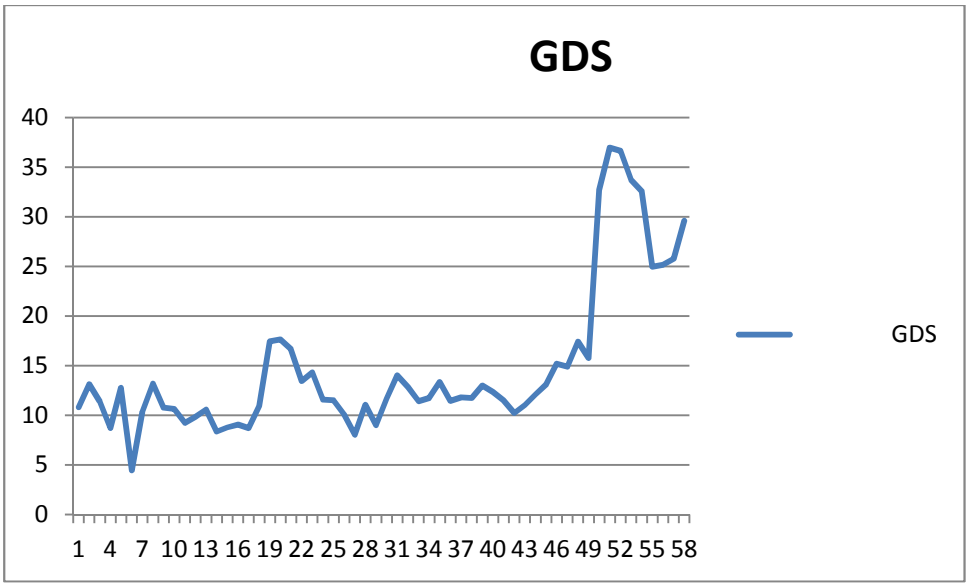
Recently, the idea of the causality has been used in many researches on relationship between savings and economic growth. Caroll and Weil (1994), relying on the data of five year average rates of economic growth in OECD member states and this causality test came to the conclusion that economic growth rate was the cause of savings in Granger sense. However, Attanasio, Picci and Scorcu (2000) questioned the reliability of the results obtained by Caroll and Weil (1994), implying that the use of annual data instead of average data from five years improves the precision and statistical importance of estimates and changes the structure of the causal relationship between variables. Mohan (2006) analyzed the relationship between economic growth and savings in four groups of countries with various levels of economic development in the 1960-2001 period, employing Granger technique. The results of this research revealed that in 13 of the analyzed countries economic growth was the cause of increased savings in Granger sense. Savings being the cause of economic growth were obtained in two countries as the opposite results. In five countries, however, the scientist confirmed the existence of a two-way relationship between economic growth and savings. The relationships between domestic savings, direct foreign investment and economic growth in Kazakhstan in the 1993-2002 Period were analyzed using the Granger causality test and co-integration methods (Katircioglu and Naraliyeva (2006). The results found one-way, positive relation between domestic savings and economic growth in Kazakhstan in a long period of time.

OVERVIEW OF SAVING AND ECONMIC GROWTH OF MYANMAR

Higher rate of savings is associated with higher rate of economic growth and development, while low savings lead to vicious circle and economic stagnation in the conventional wisdom. Savings is very important for Myanmar due to its stage of growth (pre-condition for take-off). However, domestic saving rate has been low for decades in Myanmar compared to other Asian countries. The reasons are that majority of Myanmar people are low incomes with lack of education and alternative employment opportunities and a primarily rural population engaged in agriculture and related activities. Moreover, until recently Myanmar has limited access to financial services, explaining low levels of formal saving partly.

The following chart provides information about the rate of gross domestic saving from GDP in Myanmar in the periods between 1961 and 2018. Gross domestic savings are computed as GDP less final consumption expenditure (total consumption). Units are measured in percentage. Overall, the data can be seen that Myanmar gross saving rate is found to be fluctuated but gradually become higher.

Figure (1) Rate of Gross Domestic Saving in Myanmar

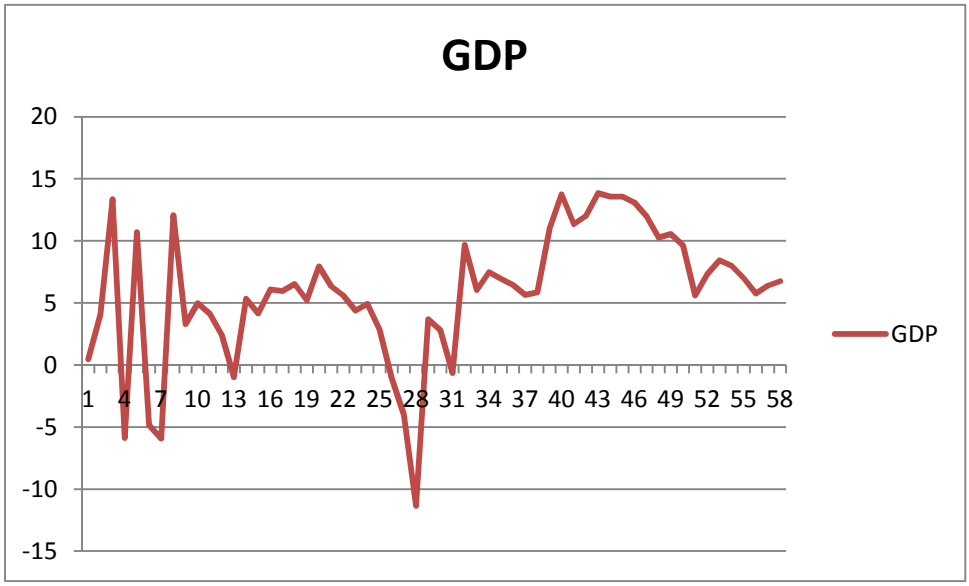


Source: World Bank

Figure (1) indicates percentage of saving. Gross saving rates were under 15% respectively during the periods between 1996 and 2004. The worst percentage amounting to below 5% was in the year 2002 and 2003. However, from the beginning of 2008, surprisingly, saving rate sharply went up up to over 15% except a little bit decline in 2009. Over the following years, the patterns of saving were noticeably different. The percentage of gross savings from GDP increased radically to 33% in 2010 and then over 35% in 2011 and 2012. Myanmar's gross savings rate was 26.7% in the year ending 31 March 2017 compared with 26.2% in the year ending 31 March 2016. Gross domestic savings (% of GDP) in Myanmar was at 29.59 % in 2018.

The figure (2) illustrates yearly GDP growth rate of Myanmar, which covers the periods from 1960 to 2019. At the start of period, the figure fluctuated heavily and this trend looked gentle in the periods between 1980 and 1985. Following years GDP growth rate fell sharply due to the political upheaval and state strike. After 1990s, the line graph shows smoother, meaning that the growth rate become stable generally. However, in 2019, the growth rate saw a sharp decline amounting to 2.9% especially due to COVID-19 effects.

Figure (2) The Rate of Gross Domestic Product of Myanmar



Source: World Bank

Owing to table (2) Myanmar's GDP represents 0.06% of world economy. Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2010 U.S. dollars.

Research questions

1. Is there causal relationship between saving and economic growth?
2. Are these two variables unidirectional or bidirectional?
3. Which theory is appropriate, Keynesian theory or Solow growth model for Myanmar?

Objectives of study

1. To investigate relationship between gross domestic saving and gross domestic product of Myanmar
2. To identify direction of two variables
3. To search for theory relevant for Myanmar

Method of study

Annual time-series data for gross domestic product and gross domestic saving are obtained from the world bank and Asian Development bank. The study covers periods from 1961 to 2018(57 years). Therefore, this research is done by using secondary data. Based on econometric model**,** Augmented Dickey-fuller test, co-integration, Vector Error correction model and causality techniques are applied.

Model Estimation

This paper applies econometric model based on the Keynesian model and Solow's hypothesis. Keynesian model postulates that Saving "S" is a function of income (Y). Therefore,

$$S = \alpha_0 + \alpha_1 Y + \epsilon_1 \qquad (1)$$

Notwithstanding, for this study, the equation mentioned above is modified to derive the one below:

$$GDS = \alpha_0 + \alpha_1 GDP + \epsilon_1 \qquad (2)$$

GDS and GDP denote saving and economic growth respectively. However, Solow hypothesized that saving promotes economic growth. Therefore, the growth model specifies economic growth as a function of saving. Thus,

$$GDP = \beta_0 + \beta_1 GDS + \epsilon_2 \qquad (3)$$

Where α_0 and β_0 are constants and α_1 and β_1 represent slope coefficients respectively. ϵ_1 and ϵ_2 are assumed as error term in the respective equations.

Empirical Test and Discussion

After stating saving and growth equations, a unit root (stationary) test is performed in order to make sure time series are stationary or non-stationary. The reason is to abstain spuriousness of regression outcomes. Stationary test is needed in better economic theory before estimating their relationship. Thus, the results of stationary test is expressed as follows:

Hypothesis for GDP and GDS-

Null hypothesis H_o: GDP have a unit root (Non-Stationary)

Alternative hypothesis H_1: GDP does not have a unit root (Stationary)

Null hypothesis H_o: GDS have a unit root (Non-Stationary)

Alternative hypothesis H_1: GDS does not have a unit root (Stationary)

Table (1) Results of Dickey-Fuller test for unit root

	P-value for Z(t)	Test statistic	1% critical value	5% critical value	10% critical value	Order of Integration
GDP	0.0000	-5.645	-4.135	-3.493	-3.176	Stationary at level
GDS	0.0000	-7.748	-4.137	-3.494	-3.176	Stationary at first difference

Source: Researcher's estimation using STATA Software

According to Table(1), the stationary test indicates and the variable GDP is stationary at level at 1%, 5% and 10% respectively because P-value for GDP is smaller than 0.05 (95%) and absolute value of test statistics is greater than all critical value of GDP. Therefore, null hypothesis stating GDP has a unit root is rejected. However, the variable GDS become only at first differencing at 1%, 5% and 10% respectively leading to rejection of null hypothesis, assuming GDS has a unit root. The test statistics is negative. By contrast, the more negative the value of test statistics, the stronger the evidence for rejecting the null hypothesis of a unit root.

Tests for co-integration

After examining unit root test for stationary, in this section, second phase is to investigate whether two variables are co-integrated using co-integration rank of Vector Error correction model (Johansen co-integration test). In this regard, there exists the following hypothesis.
H_0: there is no co-integration between two variables
$H_{1:}$ there is co-integration between two variables

Table (2) **Result of Cointegration**

Maximum rank	eigenvalue	Trace statistic	5% critical value
0		26.8394	15.41
1	0.31288	6.2005	3.76
2	0.10661		

Source: Researcher's estimation employing STATA Software

Table (3)) **Result of co-integration**

Maximum rank	eigenvalue	Maximum statistics	5% critical value
0		20.6389	14.07
1	0.31288	6.2005	3.76
2	0.10661		

Source: Researcher's estimation employing STATA Software, August 2020

In this test, only trace statistics, maximum statistics and critical value are taken into consideration whether two variables are co-integrated or not. Trace statistics (26.8394) is found to be higher than the critical value (15.41) at 5% level in the maximum rank of 0 and the value of trace statistics (6.2005) is higher than critical value (3.76) in the maximum rank of 1. Likewise, maximum statistics (20.6389 and 6.2005) also shows greater than the critical values (14.07 and 3.76) at 5% level in the maximum ranks 0 and 1respectively. Thus, Null hypothesis (H_0) is rejected. It indicates 2 co-integration equations at 5% level. Because two series are co-integrated, they exhibit a long-run relationship. It is can be inferred series are related and can be combined in a linear fashion. Even if they are at shocks in the short-run, which may affect movement in the individual series, they would converge over time (in the long-run). Thus it is needed to estimate long-run models. The estimation requires the use of Vector Error Correction model.

Long-run results of VECM and Causality

In this section, causal relationship between two variables is checked using Vector Error correction model and causality test. GDP and GDS are interchangeably used as explained variables. Table 4 and 5 shows all results of relationship.

Table (4) Result of causality (Johansen normalization restriction imposed)

Beta	Coefficient	Std. Error	Z	p> | z|	95% conf. interval
Ce1					
GDP	1				
GDS	-7.212811	1.495966	-4.82	0.000	-10.14485 -4.280772
cons	-3.339776				

Source: Researcher's estimation, employing STATA Software

In table (4) Ce1 refers to error correction term. GDP is stated as dependent variable according to Solow's model. The signs of coefficients are interpreted to be reversed in the long-run according to VECM meaning relationship among the variables are elasticity relationship. The table (4) illustrates P-value of GDS (0.000) is smaller than 0.05(95% confidence level). Thus, GDS (gross domestic saving) has a positive impact on GDP (gross domestic product) in the long-run and the coefficient (-7.212811) is statistically significant at 1% level (99% confidence). A percentage change in GDS would result in 7.21% increase in GDP.

Table (5) Result of Causality (Johansen normalization restriction imposed)

.

	Coef.	Std. Err.	z	P>|z|	95% Conf. Interval
_ce1					
GDS	1				
GDP	-.1386422	.107504	-1.29	0.197	-.3493461 .0720617
cons	.4630339				

Source: Researcher's estimation employing STATA Software

In table (5) GDS is stated as dependent variable according to Keynesian theory. The table (5) illustrates P- value of GDP (0.197) is bigger than 0.05 (95% confidence level). Thus, GDP (gross domestic product) has no impact on GDP (gross domestic saving) in the long-run. To sum up outcomes mentioned above, GDP and GDS have a unidirectional running from saving from economic growth, not vice versa. Therefore, Keynesian theory is rejected while Solow's hypothesis is accepted in this study. Various measures for government would be to take optimal monetary and tax policy in order promote saving.

Diagnostic test for VECM

Diagnostic tests such as autocorrelation and test for normality are conducted to make sure whether VECM is correctly specified or not.

H_o: there is no autocorrelation at lag order

H_1: there is autocorrelation at lag order

Table (6) Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	4.6966	4	0.31987

2	9.1189	4	0.05820

Source: Researcher's estimation employing STATA Software

In table (6), at lag 1 and lag 2, p-values are insignificant and therefore null hypothesis is accepted while alternative hypothesis is rejected. This means at lag 1 and lag 2, VECM model is free from autocorrelation problem.

H_o: Residuals of variables are normally distributed
H_1: Residuals of variables are not normally distributed

Table (7) Normality test

Equation	chi2	Degree of freedom	Prob>chi2
D_GDP	5.939	2	0.05134
D_GDS	181.809	2	0.00000
All	187.747	4	0.00000

Source: Researcher's estimation

In table (7), p-value of GDP is significant, indicating H_o is not accepted. Hence, residuals of variables are not normally distributed.

Findings and Suggestions for policy Implementation

This paper investigates causal relationship between saving and economic growth in Myanmar. The study found that saving and economic growth has long-term relationship while causality statistics indicates that the two variables are unidirectional running from saving to economic growth. According to researcher's model estimation, Solow's model that saving precedes economic growth is accepted while Keynesian theory with the assumption of higher economic growth leading to higher saving rate is rejected. Therefore, saving plays a major role in Myanmar' economic growth and it is recommended that government and policy makers should establish policies that will increase saving so as to accelerate economic growth which in turn leads to economic growth. Because people's income is the major determinant of saving, wage policy needs to be reconsidered from central and local government point of view. For many employment opportunities, foreign direct investment policy requires amendments. Interest of people for increased saving may also be persuaded through taxation. It is recommended to introduce the reasonable model of taxation based on benefits on incomes from investments. And, fruitful results of transformation of people's saving are determined by strong financial institutions and their attractive financial instruments. And the measures for government would be to take optimal monetary and tax policy. Thus, monetary authorities concerned need to conduct as a facilitator in this regard.

Need for further Research

Though saving is very important for economic growth, further researches are needed to do how other variables (FDI, electricity, trade, government expenditure, interest rate, technology capability, human capital etc.) effect economics growth

Acknowledgement

I would like to express my special thanks to Professor Dr. Yi Yi Win, Rector of Co-operative University, Thanlyin who gave me the golden opportunity to read this wonderful research. And I would also like to show my deep gratitude to Silja Bellinger, Research Mentor from Frankfurt school of Finance and Management, who supervised my paper.

References

Abu, N., 2010. Saving-economic growth nexus in Nigeria, 1970-2007: Granger causality and co-integration analyses. *Review of Economic and Business Studies (REBS)*, (5), pp.93-104.

Bairamli, N. and Kostoglou, V., 2010. The role of savings in the economic development of the Republic of Azerbaijan. *International Journal of Economic Sciences and Applied Research*, *3*(2), pp.99-110.

Ciftcioglu, S. and Begovic, N., 2010. Are domestic savings and economic growth correlated? Evidence from a sample of Central and East European countries. *Problems and perspectives in management*, (8, Iss. 3), pp.30-35.

El-Seoud, M.S., 2014. Testing the Relationship between Private Savings and Economic Growth: Case of Bahrain. *Global Journal of Commerce and Management Perspective*, *1*, pp.38-44.

Farhan, M. and Akram, M., 2011. Does Income Level affect Saving Behaviour in Pakistan? ARDL approach to co-integration for empirical assessment. *Far East Journal of Psychology and Business*, *3*(3), pp.62-72.

GUJARATI, D. N., & PORTER, D. C. (2010). *Essentials of econometrics*. New York, McGraw-Hill/Irwin.

https://tradingeconomics.com/myanmar/gdp

https://tradingeconomics.com/myanmar/gross-domestic-savings-percent-of-gdp-wb-data.html

https://www.intelligenteconomist.com/economic-growth

https://www.macrotrends.net/countries/MMR/myanmar/gdp-growth-rate

https://www.mmtimes.com/news/myanmar-seeks-boost-savings.html

Jagadeesh, D., 2015. The impact of savings in economic growth: An empirical study based on Botswana. *International Journal*, *10*.

Lean, H.H. and Song, Y., 2009. The domestic savings and economic growth relationship in China. *Journal of Chinese Economic and Foreign Trade Studies*.

Misztal, P., 2011. The Relationship between Savings and Economic Growth in Countries with Different Level of Economic Development (Wspólzaleznosci miedzy oszczednosciami i wzrostem gospodarczym w krajach o róznym poziomie rozwoju gospodarczego). *Finansowy Kwartalnik Internetowy e-Finanse*, *7*(2), pp.17-29.

Mphuka, C., 2010. Are Savings Working for Zambia's Growth?. *Zambia Social Science Journal*, *1*(2), p.6.

Myanmar Insider (2018). Saving Habits of people in Myanmar

Najarzadeh, R., Reed, M. and Tasan, M., 2014. Relationship between savings and economic growth: The case for Iran. *Journal of International Business and Economics*, *2*(4), pp.107-124.

Sothan, S., 2014. Causal relationship between domestic saving and economic growth: Evidence from Cambodia. *International Journal of Economics and Finance*, *6*(9), p.213.

Turan, G. and Gjergji, O., 2014. What is the impact of savings on growth? The case of a small open economy (Albania). *Mediterranean Journal of Social Sciences*, *5*(13), pp.360-360.

Wooldridge, J. M. (2013). Introductory econometrics: A modern approach. 5th ed. Mason, OH: South-Western Cengage Learning.

www.worldbank.org, Myanmar Overview