Asian Journal of Economic Modelling
ISSN(e): 2312-3656
ISSN(p): 2313-2884
DOI: 10.18488/journal.8.2017.53.245.252
Vol. 5, No. 3, 245-252

URL: www.aessweb.com

IMPACTS OF DOMESTIC SAVINGS ON ECONOMIC GROWTH OF VIETNAM

Nhung Thi Kim NGUYEN[1+]
Hiep Huu NGUYEN[2]

[1,2]*Faculty of Economics and Business Administration, Hatinh University, Vietnam*

(+ Corresponding author)

Article History
Received: 18 April 2017
Revised: 23 May 2017
Accepted: 2 June 2017
Published: 15 June 2017

Keywords
Economic growth
Savings
Investment
ARDL
Vietnam
Long run
Short run.

ABSTRACT

This paper aims to examine the short run and long run impacts of domestic savings on economic growth of Vietnam during the 1986-2015 period by using ARDL bound testing approach, while accounting for domestic investment and dependency ratio. The short run estimates show that domestic savings, domestic investment and dependency ratio do not have any impacts on economic growth. The long run estimates show that domestic savings and investment are the engines of Vietnam economic growth while dependency ratio has a negative impact on growth.

Contribution/ Originality: The paper's primary contribution is finding that domestic savings and investment contribute to Vietnam long run economic growth. Meanwhile, dependency ratio or a rise in the non-productive population has a negative impact on Vietnam long run economic growth.

1. INTRODUCTION

Economic growth is an important condition for countries to achieve high and sustainable economic development. It is seen as a measure for the government success. Therefore, many researchers and policy makers have conducted extensive studies on the determinants of economic growth. One of major factors impacting economic growth is savings. It is theoretically believed that savings can boost economic growth through physical capital accumulation. This research utilizes ARDL model approach to cointegration and error correction model to study the impacts of domestic savings on economic growth of Vietnam for the 1986-2015 period.

According to classical model of Lewis (1955) the key to growth was the increase in savings and investment. The economy is assumed to be divided into two sectors: agricultural sector and industrial sector. The low productivity in agricultural sector urges people to move away from the villages to work in the industrial sector where they can earn higher income. This consequently generates more savings which can provide more funds for

investment to boost economic growth. The lack of growth was due to the lack of saving, which in turn due to the lack of the modern industrial sector.

Harrod (1939) and Domar (1946) also stressed the importance of saving and investment as the driver of growth. Basically, this model implies that a country can achieve growth by either increasing the level of national saving or reducing the capital output ratio. The growth in these countries depends on policies to encourage saving rate.

However, it should be noted that not all savings can lead to growth because part of the savings is used for replacing the obsolete capital. Based on this argument, Solow (1956) points out that saving rate only causes growth in the short run, the long run growth depends on technological progress. A permanent increase in the saving rate will initially increase capital stock, causing output per worker to grow in the short run. However, in subsequent periods, due to diminishing return the increased savings is only sufficient to cover the depreciation of capital per worker. Therefore, in the long run although the economy comes to a higher level of steady state, the growth rate is zero.

Endogenous growth model postulates that increased saving rate causes capital accumulation and then accelerates economic growth (Barro and Sala-i-Martin, 1995). According to Ramsey model, increased saving can raise national income and then investment in the short run but does not have any impacts on long run growth (Romer, 2006).

The key thrust of these models is that saving is crucial for economic growth through availing more funds for investment.

2. LITERATURE REVIEW

Jappelli and Pagano (1992) carry out experimental research on savings, growth and limitation of liquidity from 1960 to 1987 in 22 OECD countries and find that the more saving a country has, the higher growth rate it achieves.

Wilson (2005) tries to examine the interdependencies among savings, investment, foreign flow and economic growth in India using ordinarily least squares for annual data from 1950 to 2001. It is found that per worker saving and investment have an impact on GDP in the long run meanwhile in the short run GDP per worker have a significant but limited impact on per worker savings and investment.

Using ARDL method to study the case of India for the 1954-2004 period,Verma (2007) finds that apart from when GDP is the dependent variable, there exists a long run relationship among investment, domestic saving and economic growth. The economic evidence shows that savings is not the cause of economic growth but growth is the cause of savings.

Hooi and Yingzhe (2009) study the domestic savings and economic growth relationship in China for the 1955-2004 period by using cointegration method. Taking into account the two types of savings: household savings and corporate savings, the authors find economic growth has a long run relationship with household savings and corporate savings. In the short run, domestic savings and economic growth have bilateral causality but in the long run unidirectional causality runs from domestic savings growth to economic growth.

Misztal (2011) explores the correlation between economic growth and savings in several groups of countries. The results were consistent with the Solow model, showing a unidirectional relationship running from domestic savings to gross domestic product in the case of advanced countries, emerging and developing countries. The growth of domestic savings was the cause of gross domestic products in these countries.

Mohsen and Maysam (2013) use ARDL model to examine the relationship between savings and economic growth in Iran for the 1970-2010 period. Their results confirm that labour force, oil revenues, saving, education and real GDP are cointegrated. Savings has a limited impact on real GDP in the long run. A 1% increase in savings leads to 0.19% increase in real GDP. However, in the short run, saving plays a more important role with 0.46 percent increase in economic growth associated with 1 percent increase in savings.

Seng (2014) examines the relationship between saving and economic growth for the case of Cambodia from 1989 to 2012. The study finds that domestic savings and economic growth do not depend on each other in Cambodia. This conclusion is consistent with Ijeoma *et al.* (2011) and Robson (2014).

Dhanya (2015) investigates the importance of savings for economic growth in Botswana by using the ARDL approach. The results support the Harrod Domar model. The lack of domestic private savings holds back economic growth in a developing country like Botswana.

Both theoretically and empirically, there is still debate about the role of domestic savings on economic growth. This study aims to make an extension of this debate to a developing country like Vietnam by determining the short run and long run effects of domestic savings on economic growth of Vietnam. ARDL approach to cointegration is applied for the 1986-2015 period data.

3. DATA

There are four variables, namely Gross Domestic Product per capita (GDP), Gross Domestic Saving (GDS) and Gross Domestic Investment (GDI), Dependency ratio (DR) (dependents to working age population). The annual data for the 1986-2015 period are extracted from the World Bank,WDI (2015). With a view to making the model linear and homoscedastic, all the data are transformed into natural logarithm (Shawa and Shen, 2013). The data can be denoted as: lgdp, lgds, lgdi, ldr respectively.

4. METHODOLOGY

4.1. Model Specification

The model aims to examine the impact of gross domestic saving on economic growth. The model is specified as:

$$lgdp_t = \beta_o + \beta_1 lgds_t + \beta_2 lgdi_t + \beta_3 ldr_t + \varepsilon_t$$

Definition of variable:

Variable	Definition
lgdp	natural log of GDP per capita
lgds	natural log of Gross Domestic Saving
lgdi	natural log of Gross Domestic Investment
ldr	natural log of Dependency ratio

4.2. Autoregressive Distributed Lag (ARDL) Approach to Cointegration

This research utilizes ARDL bound testing approach to co-integration to examine the long run relationship among Gross Domestic Product per capita, Gross Domestic Saving and Gross Domestic Investment and Dependency ratio. The ARDL method was initialy developed by Pesaran and Shin (1999) and then further extended by Pesaran *et al.* (2001). ARDL model is popular for a number of reasons (i) The variables in ARDL model are not required to be of the same order as Johansen and Juselius (1990) provided that the order of integration does not exceed one (ii) The long run and short run dynamic can be estimated simultaneously (iii) The dependent and explanatory variables are distinguished (iv) The ARDL model performs better for a small sample size (Paul, 2014). ARDL model can be specified as:

$$\Delta lgdp_t = \delta_o + \sum_{i=1}^{l} \alpha_i . \Delta lgdp_{t-i} + \sum_{i=0}^{m} \gamma_i \Delta lgds_{t-i} + \sum_{i=0}^{n} \omega_i \Delta lgdi_{t-i} + \sum_{i=0}^{k} \theta_i \Delta ldr_{t-i} + \varphi_1 . lgdp_{t-1} + \varphi_2 lgds_{t-1} + \varphi_3 . lgdi_{t-1} + \varphi_4 . ldr_{t-1} + \eta_t \quad (2)$$

Δ denotes first difference operator, l, m, n, k are the lag length and η_t is the error term. An F test is utilized to estimate the long run relationship. The null hypothesis is that there is no cointegration among the variables,

denoted as $Ho: \varphi_1 = \varphi_2 = \varphi_3 = \varphi_4 = 0$. Meanwhile, the alternative hypothesis of co-integration is defined as $H_1 : \varphi_1 \neq \varphi_2 \neq \varphi_3 \neq \varphi_4 \neq 0$. Narayan (2005) gives two sets of critical values for a small sample size (30 to 80 observations). The first set is the lower critical bound when all variables are purely I (0) while second set is the upper critical bound when all variables are purely I (1). If the calculated F-statistic is greater than the upper critical value, the null hypothesis is rejected, meaning the variables are cointegrated. If the calculated F-statistic is smaller than the lower critical value, the null hypothesis is not rejected, meaning the variables are not cointegrated. The result is inclusive if the F-statistic is between the lower bound and the upper bound. Once co-integration is confirmed, the long run model and short run dynamic are derived.

The long run model:

$$\text{lgdp}_t = \gamma_o + \sum_{i=1}^{h} \partial_{1i} \text{lgdp}_{t-i} + \sum_{i=0}^{p} \mu_{1i} \text{lgds}_{t-i} + \sum_{i=0}^{q} \theta_{1i} \text{lgdi}_{t-i} + \sum_{i=0}^{v} \Im_{1i} \text{ldr}_{t-i} + \varepsilon_{1t} \quad (3)$$

The short run dynamic:

$$\Delta\text{lgdp}_t = \propto_o + \sum_{i=1}^{g} \partial_{2i} \Delta\text{lgdp}_{t-i} + \sum_{i=0}^{h} \mu_{2i} \Delta\text{lgds}_{t-i} + \sum_{i=0}^{u} \theta_{2i} \Delta\text{lgdi}_{t-i} + \sum_{i=0}^{z} \Im_{2i} \text{ldr}_{t-i} + \theta\text{ect}_{t-1} + \varepsilon_{2t} \quad (4)$$

θect_{t-1} is expected to be significant and has a negative sign if there is co-integration among the variables. Finally, the goodness of fit of the model and the parameter stability are checked through diagnostic tests.

5. EMPIRICAL RESULTS

5.1. Descriptive Statistics

The descriptive statistics provide information about the mean, median, maximum, minimum and standard deviation of the variables over the sample period.

Table-1. Descriptive statistics

	LGDP	LGDS	LGDI	LDR
Mean	15.28949	2.851192	3.241377	4.068031
Median	15.66715	3.124559	3.319743	4.098092
Maximum	17.63809	3.454948	3.677977	4.376660
Minimum	9.204531	1.202183	2.530982	3.742901
Std. Dev.	1.997809	0.661781	0.326339	0.233361

Source: Author's calculation using E-views 9.5

5.2. Augmented Dickey Fuller Test for a Unit Root

Before applying the ARDL approach to cointegration, the order of integration of the series is evaluated through unit root tests. The ARDL model can be applied as long as the order of integration does not exceed one (Pesaran and Pesaran, 1997). The stationary of the series is checked through applying Augmented Dickey Fuller (ADF) test.

Table-2. The ADF test

Variables	Constant without trend		Constant with trend		Order of integration
	Level	First Difference	Level	First Difference	
lgdp	0.2952	0.0002***	0***	0.0046***	I(1)
lgds	0.2675	0.0000***	0.5654	0.0001***	I(1)
lgdi	0.3677	0.0001***	0.9214	0.0009***	I(1)
ldr	0.0104**		0.0834*		I(0)

Note: *, ** and *** denote significance level at 10%, 5%, and 1% respectively
Source: Author's calculation using E-views 9.5

The above ADF test shows that lgdp, lgds and lgdi are only stationary after taking the first difference so they are I (1) variables. Meanwhile, ldr is stationary at level so is I (0) variable. As all the variables are either (0) or I(1), ARDL approach to cointegration is applied.

Table-3. Cointegration test

Model for estimation F_{lgdp} (lgds/lgdi/lgdr)	Optimal lag length ARDL(2, 0, 1, 2)	F-statistics 15.44988	Significant level	Critical bound	
				F statistics	
				I(0)	I(1)
			1%	5.333	7.063
			5%	3.710	5.018
			10%	3.008	4.150

Source: Author's calculation using E-views 9.5

The ARDL test result reveals that the calculated F-statistics (15.44988) is greater than upper critical bound as indicated in the Narayan (2005) table which means variables have a long-run relationship.

Long-run coefficients of variables in ARDL (2, 0, 1 , 2) model are estimated in the next step and the results are presented in table 4.

Table-4. Long run estimates results

Long Run Coefficients				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
LGDS	0.578336	0.077936	7.420601	0.0000***
LGDI	0.356575	0.155204	2.297455	0.0331**
LDR	-3.723550	0.162387	-22.930081	0.0000***

Source: Author's calculation using Eviews 9.5. **, *** indicates statistically significant variables at 10% and 5% respectively.

As shown in table 4, the empirical results show that domestic savings has a positive effect on economic growth in the long run. The value of the coefficient on Gross Domestic Savings is 0.578336 which means that a 1% increase in domestic savings is associated with approximately 0.58% increase in economic growth. The regression coefficient of lgdi carries positive sign and is statistically significant at 5% level. This implies that GDI affects the GDP significantly. A 1% increase in Gross Domestic Investment causes Gross Domestic Products to increase by approximately 0.36%. The dependency ratio shows a significantly negative long-run association with economic growth. The coefficient suggests that a 1% reduction in dependency ratio is associated with a 3.72% increase in economic growth.

The Vector Error Correction Model is applied to examine the short run effects of domestic savings on Vietnam economic growth. From the table 5, the error correction term is significant and carries the negative sign. This confirms the cointegration test. The coefficient of -0.53 depicts an adjustment rate of 53% with a statistical

significance of one percent. Interestingly, none of the four explanatory variables has significant impacts on Vietnam economic growth in the short run.

Table-5. Error correction model estimates

Cointegrating Form				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(LGDP(-1))	-0.176768	0.157956	-1.119093	0.2770
LGDS	-0.009596	0.060424	-0.158811	0.8755
D(LGDI)	0.332437	0.204565	1.625091	0.1206
D(LDR)	2.948185	4.705691	0.626515	0.5384
D(LDR(-1))	3.875715	5.650674	0.685886	0.5011
C	15.251710	2.630297	5.798475	0.0000
CointEq(-1)	-0.532773	0.092673	-5.748929	0.0000
Cointeq = LGDP - (0.5783*LGDS + 0.3566*LGDI -3.7236*LDR)				

Source: Author's calculation using E-views 9.5

Diagnostic test shows that the model is free from serial correlation, model misspecification and incorrect functional form. The residuals are normally distributed and homoscedastic.

Table-6. Diagnostic Test

	Test Statistic	**P-value**
Serial Correlation	F_statistic = 1.492753	0.2528
Functional Form	F_statistic = 0.356366	0.7053
Normality	$X^2_{(2)} = 0.700944$	0.704356
Heteroskedasticity	F_statistic = 0.874155	0.5546

Source: Author's calculation using E-views 9.5

The cumulative sum of residual (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) tests have been used to test the stability of the economic growth equation. Figures 1 and Figure 2 report the results of the tests, showing that the parameters of the equations are stable over the sample period.

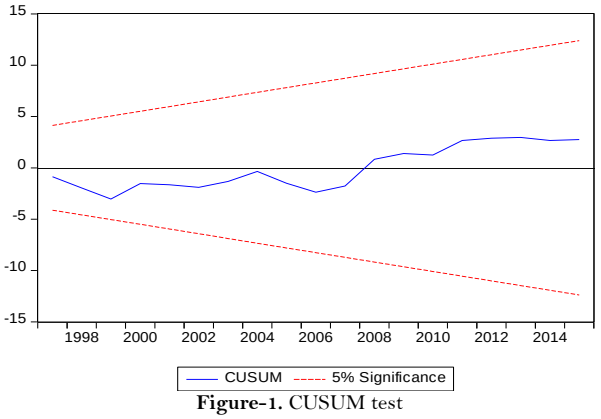

Figure-1. CUSUM test

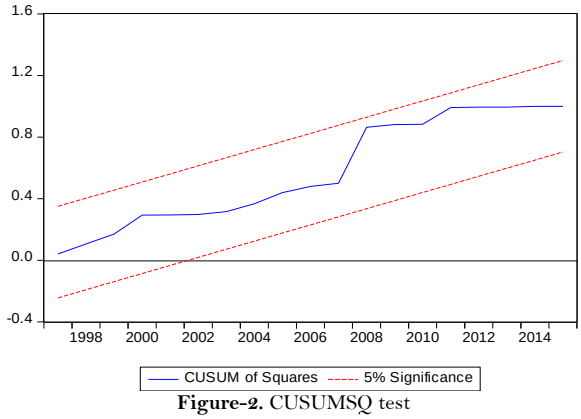

Figure-2. CUSUMSQ test

Source: Author's calculation using E-views 9.5

6. CONCLUSION

This research has utilized the ARDL approach to cointegration to examine the short run and long run impacts of domestic savings on Vietnam economic growth. The annual data for the 1986-2015 period are withdrawn from the World Bank. We find a cointegration relationship among GDP per capita, gross domestic savings, gross domestic investment and dependency ratio. In the long run, gross domestic savings has a significant positive impact

on Vietnam economic growth. This finding is consistent with Najarzadeh *et al.* (2014). Similarly, gross domestic investment has a positive impact on Vietnam economic growth. On the contrary, the dependency ratio has a negative association with economic growth. This finding is consistent with (An and Jeon, 2006; An and Jeon, 2006 ; Nguyen, 2009; Nguyen, 2009; Joe *et al.*, 2015; Joe *et al.*, 2015). In the short run, gross domestic savings, gross domestic investment and dependency ratio do not play any significant role in Vietnam economic growth.

As domestic savings and investment can accelerate Vietnam economic growth in the long run, it is important to issue policies aiming at promoting domestic savings and investment across the country. However, a higher dependency ratio or an increase in the non working population can reduce growth. One possible explanation is that a growth in the non productive population can increase the burden on the public finance, causing a higher rate of borrowing and tax. Policies are therefore required to reduce this ratio.

Funding: This study received no specific financial support.
Competing Interests: The authors declare that they have no competing interests.
Contributors/Acknowledgement: Both authors contributed equally to the conception and design of the study.

REFERENCES

An, C. and S. Jeon, 2006. Demographic changes and economic growth in Korea. Paper Presented at the APEA Conference 2006.

Barro, R.J. and X. Sala-i-Martin, 1995. Economic growth / Robert J. Barro, Xavier Sala-i Martin. New York: McGraw Hill.

Dhanya, J., 2015. The impact of savings in economic growth: An empirical study based on Botswana. International Journal of Research in Business Studies and Management, 2(9): 10-21. *View at Google Scholar*

Domar, E.D., 1946. Capital expansion, rate of growth, and employment. Econometrica, 14(2): 137-147. *View at Google Scholar* | *View at Publisher*

Harrod, R., 1939. An essay in dynamic theory. Economic Journal, 49(193): 14-33. *View at Google Scholar* | *View at Publisher*

Hooi, H.L. and S. Yingzhe, 2009. The domestic savings and economic growth relationship in China. Journal of Chinese Economic and Foreign Trade Studies, 2(1): 5-17. *View at Google Scholar* | *View at Publisher*

Ijeoma, O., C. Paramaiah and R.E. Moshoeshoe, 2011. Financial development, savings and economic growth in Lesotho: Evidence from trivariate causality test. International Journal of Economics and Business Studies, 1(2): 41-55. *View at Google Scholar*

Jappelli, T. and M. Pagano, 1992. Saving, growth and liquidity constraints. Centre for Economic Policy Research, Discussion Papers(662).

Joe, W., A.K. Dash and P. Agrawal, 2015. Demographic transition, savings, and economic growth in China and India. Delhi: Inst. of Economic Growth, Unvi. of Delhi Enclave, 351.

Joe, W., A.K. Dash and P. Agrawal, 2015 Demographic transition, savings, and economic growth in china and india. Delhi : Inst. of Economic Growth, Unvi. of Delhi Enclave.

Johansen, S. and K. Juselius, 1990. The maximum likelihood estimation and inference on cointegration - with application to the demand for money. Oxford Bulletin of Economics and Statistics, 52(2): 169-210. *View at Google Scholar*

Lewis, W.A., 1955. The theory of economic growth. Homewood, Ill: R. D. Irwin.

Misztal, P., 2011. The relationship between savings and economic growth in countries with different level of economic development. E Finanse, 7(2): 17-29. *View at Google Scholar*

Mohsen, M. and M. Maysam, 2013. The relationship between saving and GDP in Iran based on ARDL bounds testing approach. International Journal of Applied Economic Studies, 1(1): 1-6. *View at Google Scholar*

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

Narayan, P.K., 2005. The saving and investment nexus for China: Evidence from cointegration tests. Applied Economics, 37(17): 1979-1990. *View at Google Scholar* | *View at Publisher*

Nguyen, M.T., 2009. Dynamic demographics and economic growth in Vietnam. Journal of the Asia Pacific Economy, 14(4): 389-398. *View at Google Scholar | View at Publisher*

Paul, B., 2014. Testing export-led growth in Bangladesh: An ARDL bounds test approach. International Journal of Trade, Economics and Finance, 5(1): 1-5. *View at Google Scholar | View at Publisher*

Pesaran, H.M. and Y. Shin, 1999. Autoregressive distributed lag modelling approach to cointegration analysis, Chapter 11. In Storm, S., (Ed.) ,Econometrics and economic theory in the 20th. Century: The Ragnar Frisch Centennial Symposium. Cambridge: Cambridge University Press.

Pesaran, M.H. and B. Pesaran, 1997. Working with microfit 4.0: Interactive econometric analysis /M. Hashem Pesaran and Bahram Pesaran. Oxford: Oxford University Press.

Pesaran, M.H., Y. Shin and R.J. Smith, 2001. Bounds testing approaches to the analysis of level relationships. Journal of Applied Econometrics, 16(3): 289-326. *View at Google Scholar | View at Publisher*

Robson, M., 2014. Causality between economic growth and investment in Zimbabwe. Journal of Economics and Sustainable Development, 5(20): 136-140. *View at Google Scholar*

Romer, D., 2006. Advanced macroeconomics. 3rd Edn., New York: McGraw-Hill/Irwin.

Seng, S., 2014. Causal relationship between domestic saving and economic growth: Evidence from Cambodia. International Journal of Economics and Finance, 9(9): 213-220 *View at Google Scholar | View at Publisher*

Shawa, M.J. and Y. Shen, 2013. Causality relationship between foreign direct investment, GDP growth and export for Tanzania. International Journal of Economics and Finance, 5(9): 13-19. *View at Google Scholar | View at Publisher*

Solow, R.M., 1956. A contribution to the theory of economic growth. Quarterly Journal of Economics, 70(1): 65-94. *View at Google Scholar | View at Publisher*

Verma, R., 2007. Savings, investment and growth in India: An application of the ARDL bounds testing approach. South Asia Economic Journal: Journal of the Institute of Policy Studies, Sri Lanka and Research and Information System for Non-Aligned and Other Developing Countries, India, for the SAARC Research Network, 8(1): 87-98. *View at Google Scholar | View at Publisher*

WDI, 2015. World development indicators. Retrieved from http://data.worldbank.org/products/wdi.

Wilson, E.J., 2005. Savings, investment, foreign inflows and economic growth of the Indian economy 1950-2001. NSW, Australia: School of Economics, University of Wollongong, 03/1997.