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Relationship Between Savings and Economic Growth in Nigeria

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Abstract: This study examined the cause and effect relationship between domestic savings and economic growth in Nigeria during the period 1980-2010. The researchers employed the Granger-causality and Engle-Granger co-integration techniques to analyze the relationship between savings and economic growth. In addition, the granger causality test revealed that causality runs from savings to economic growth in Nigeria. Thus, the researchers accept the Solow's hypothesis that savings precedes economic growth but reject the Keynesian theory that it is economic growth that leads to higher savings. The researchers recommended that government and policy makers should employ policies that would accelerate domestic savings so as to increase economic growth.

Key words: Domestic savings, economic growth, Granger causality, Engle-Granger co-integration

INTRODUCTION

The relationship between savings and economic growth is not only an important but also a controversial issue for both academicians and policy makers. Many internationally reputed economists have analyzed this phenomenon as cause and effect relationship. A group of economists favour capital fundamentalists point of view that savings cause growth but others are in favour of Keynesian theory that savings depend upon the level of output.

The importance of investigating the causal relationship lies in the fact that it can be useful in isolating those variables which policy makers need to control in order to obtain the desired values of target variables such as economic growth. It might also be helpful in developing the econometric models and designing policies. If it turns out to be the case that savings causes economic growth then it is necessary to enhance savings rate for achievement of high growth targets. If the results turn out the other way round that high growth leads to more savings then the Keynesian point of view is dominating: savings depends on income. Hence in order to enhance growth, the policy prescriptions will be to emphasize the demand side of the economy. However, such a prescription according to Cohen (1997) is misleading and dangerous that government needs not promote savings (Sajid and Sarfraz, 2008).

However, the mixed nature of the recent empirical findings shows that the debate on savings and growth remain inconclusive. Studies by Gavin *et al.* (1997), Sinha and Sinha (1998), Saltz (1999), Agarwal (2001) and Anoruo and Ahmad (2001) among others revealed that economic growth rates preceded savings growth rates while Bacha (1990), De Gregorio (1992), Cullison (1993), Jappeli and Pagano (1996), Krieckhaus (2002), Alguacil *et al.* (2004) and recently Lorie (2007) among others found the reverse causality. This goes in line with the central idea of Lewis (1955)'s traditional development theory that increasing savings would accelerate growth. But employing Toda and Yamamoto (1995) methodology to test for causality using data from India and Sri Lanka, Mavrotas and Kelly (2001) found no causality between GDP growth and private savings for India and a bi-directional relationship for Sri Lanka.

This research focuses on examining the causal relationship between savings and economic growth in Nigeria in order to provide the policymakers in the country with a planning tool that can help them in formulating their policies that are related to savings and economic growth. Though there are other studies on the relationship between savings and economic growth in Nigeria but there are mixed findings, for instance Abu (2010) using data from 1975-2007 employing Granger-causality and co-integration techniques revealed that causality runs from economic growth to savings but Oladipo (2009) using data from 1970-2006 employed the Toda and Yamamoto (1995) and Dolado and Lutkepohl (1996) TYDL-methodology found the reverse causality between savings and economic growth in Nigeria.

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Therefore, this study intends to use different methodology and updated data to confirm the findings. Thus, the major question that this research needs to answer is whether or not the traditional view of growth that savings growth promotes economic growth is valid for the Nigeria.

Review of relevant literature: Solow (1956) suggested that savings affected the economic growth because higher savings led to capital accumulation which in turn led to economic growth. Deaton (1995) argued that causation is important not just for understanding the process but for the design of the policy. The researcher provided support for the idea that savings was an important force for economic stability as well as growth. Husain (1995) suggested that much of the differences in economic performance between Pakistan and the rapidly growing Southeast Asian countries, over the last 2 decades were because of the low rates of savings and investment in Pakistan. Hence, it was emphasized that difference in the growth rate of developed and developing countries was primarily because of the difference in savings rates.

Consequently, World Bank asked the developing countries to adopt policies which were conducive to savings in order to boost the economic growth (Sinha and Sinha, 1998). According to this view, savings is one of the key determinants of economic growth and it occurs before growth.

There is robust empirical evidence of positive correlation between savings and growth (Modigliani, 1970, 1990; Maddison, 1992). King and Levin (1994) showed the strong connection between the two variables by interpreting the evidence of a causal chain from savings to growth. These results did support capital fundamentalists according to which capital formation was the main driving force for high economic growth. According to World Bank Policy Research Report (World Bank, 1993), East Asian economies (Indonesia, Japan, Korea, Thailand, Taiwan and China) contradicted the above-mentioned results, i.e., income growth had been a remarkably good predictor of increased savings but savings had not been a good predictor of growth. Results were mixed for Hong Kong and Malaysia and causation might run either way.

The World Bank report referred above made the economist to rethink about the relationship between savings and economic growth. With the research of Carroll and Weil (1994) something strange began to appear. Strong empirical evidence seemed to come out showing that higher savings followed higher growth. Jappeli and Pagano (1996) provided more evidence in favour of a positive causality from growth to savings, i.e., higher growth was necessary for higher savings. Hence, their results also contradicted the capital fundamentalist view on the aggregate level. The main findings of Blomstrom *et al.* (1996) were that Gross Domestic Product (GDP) growth preceded capital formation. They did not find any evidence that capital formation preceded growth. Gavin *et al.* (1997) also raised doubts about the capital fundamentalist view that savings occurred before growth.

They argued that higher growth rate precedes higher savings rather than the reverse and that the most powerful determinant of savings over the long run is economic growth. Sinha and Sinha (1998) suggested that the conventionally accepted view, i.e., higher savings rate caused higher economic growth did not hold for Mexico where the causality went in the opposite direction. Anderson conducted a study to investigate the causal relationship between real output and savings for Sweden, UK and USA. The results indicated mutual long run relationship between variables only for Sweden and UK. The result also indicated short run bidirectional causality for USA and unidirectional causality from saving to output for UK.

No significant evidence of short run causality was found for Sweden. The researcher concluded that the causal chain linking savings and output might differ across the countries. The researcher also suggested that causality in the long run might go in different directions than causality associated with short-term disturbances. Saltz (1999) investigated the direction of causality between savings and growth rate of real GDP for 18 Latin American and newly industrialized countries for the period of 1960-1991. The results lent for greater support for the hypothesis that faster growth rate of real GDP caused higher growth rate of savings. Podrecca and Carmeci (2001) found that investment shares Granger caused growth rates and at the same time growth rates Granger caused investment shares. The Granger causality from investment shares to growth rates was found to be negative.

Vanhoudt (1998) suggested that recent Granger causality research on economic growth and accumulation rates which dismissed the validity of neoclassical growth models was based on a fallacy. The researcher showed that the finding of no or negative Granger causality was perfectly consistent with a neoclassical type of model. More precisely, such a model predicted negative Granger causality between medium run growth rates and investment shares while there should not be Granger

causality between these variables in the long run. Contrary to previous researchers' intuition, there was therefore no reason to reject the mechanical link between capital accumulation and growth which was inherent to the neoclassical approach.

AbuAl-Foul (2010) employed an econometric technique to investigate the long-run relationship between real gross domestic product and real gross domestic saving for Morocco and Tunisia during the period 1965-2007 and 1961-2007, respectively. The regression exercise reveals interesting results. For instance, it was shown that whereas a long-run relationship exists between gross domestic products and savings in Morocco, there was no such evidence for Tunisia. Secondly, the Granger causality test indicates the existence of a two-way causal relationship between gross domestic product growth and gross domestic saving growth in Morocco. Lastly, the researcher observed a unidirectional Granger causality between real gross domestic product and real gross domestic saving as causality runs from gross domestic saving growth to gross domestic product growth in Tunisia.

In this study, Mohan (2006) examined the relationship between domestic savings and economic growth by taking into consideration the income levels of the different countries studied. The researcher grouped the countries into various categories, namely Low Income Countries (LICs), Low Middle Income Countries (LMCs), Upper Middle Income Countries (UMCs) and High Income Countries (HMCs). The researchers' results support the claim that causality runs from economic growth rate to growth rate of savings. The researcher submitted that the income level of a country plays an important role in determining the causal relationship between savings and economic growth. In addition, the researcher reported that empirical results were mixed in the LICs while causality runs from growth rate to savings rate for most of LMCs. Finally, whereas in the HICs (except Singapore), causality runs from economic growth rate to growth rate of savings, a feedback causal relation was more prevalent in the UMCs.

Sajid and Sarfraz (2008) investigated the causal relationship between savings and output in Pakistan by using quarterly data for the period of 1973:1-2003:4. The researchers employed both co-integration and the vector error correction techniques and discovered that bi-directional long run relationship exists between savings and output level. Moreover, the results showed that there is a unidirectional long run causality from public savings to output (GNP and GDP) and private savings to Gross National Product (GNP). Furthermore, the long run results favour the capital fundamentalist's point of view that savings precede the level of output in case of Pakistan. In addition, the results showed that unidirectional short run causality runs from Gross National Product (GNP) to national and domestic savings and from Gross Domestic Product (GDP) to public savings. Besides, short run causality was shown to run from national savings to Gross Domestic Product (GDP). Finally, the overall short run results favour Keynesian point of view that savings depend upon level of output.

Agarwal (2001) investigated the causality between Gross Domestic Product (GDP) and saving for a sample consisting Asian economies. The researcher discovered that in most economies causality runs from GDP to saving.

Anoruo and Ahmad (2001) analyzed the causal relationship between the growth of domestic savings and economic growth for a sample that consist seven African economies (Congo, Cote d'Ivoire, Ghana, Kenya, Nigeria, South Africa and Zambia). The econometric results illustrated that economic growth Granger causes the growth rate of domestic savings for all the countries except Congo where reverse causality was found. In addition, the researchers discovered a feedback causal relation for Cote d'Ivoire and South Africa. Waithima (2008) used the Hendry Model with a two-step method to model a saving function for Kenya. The researcher observed that a 1% increase in GDP growth rate causes a 0.5% increase in private saving.

Moreover, the causality tests revealed a unidirectional causality that runs from per capita GDP to private saving. In Nigeria, Olajide employed the Toda and Yamamoto (1995) and Dolado and Lutkepohl (1996) methodology to investigate the direction of causal relationship between saving and economic growth in Nigeria during the 1970 and 2006 period. The causality test results showed the existence of a unidirectional causality between savings and economic growth and the complementary role of FDI in growth.

A study by Abu (2010) employed the Granger causality and co-integration techniques to analyze the relationship between saving and economic growth in Nigeria during the period 1970-2007. The Johansen co-integration test was used to test if long-run equilibrium exists between them (economic growth and saving) (Johansen, 1988). In addition, the Granger causality test revealed that causality runs from economic growth to saving, implying that economic growth precedes and Granger causes saving. Thus, the study rejected the Solow's hypothesis that saving precedes economic growth and accepts the Keynesian theory that

it is economic growth that leads to higher saving. The researcher recommended that government and policy makers should employ policies that would accelerate economic growth so as to increase saving.

Sinha and Sinha (1996) presented evidence that economic growth Granger causes growth rate of savings in Pakistan. Sinha and Sinha (1999) examined the relationship between the growth rate of savings and economic growth in Sri Lanka. In this study, the causality was from growth rates of gross domestic savings to economic growth rate. However, Sinha (2000) did similar studies in the Philippines and found causality from economic growth rate to growth rate of domestic savings.

MATERIALS AND METHODS

Model specification: To analyze the relationship between savings and economic growth, the rseearcher used co-integration methods and Granger causality test which are the most frequently used methods of analyzing relations between savings and economic growth in economics. The econometric model used in this study is based on the Keynes (1936)'s model and the Solow (1956)'s hypothesis. According to the Keynes Model, savings (S) are the function of economic growth (Y) which can be presented by the Eq. 1:

$$S = \alpha_0 + \alpha_1 Y + \mu_1 \quad (1)$$

Where:

S = Savings
Y = Economic growth
α_0 = Free term in the equation
α_1 = Savings to economic growth sensitivity coefficient
μ_1 = Random component

On the other hand, according to the Solow hypothesis, savings are a determinant of economic growth. In this way, economic growth is the function of savings which can be presented by the Eq. 2:

$$Y = \beta_0 + \beta_1 S + \mu_2$$

Where:

S = Savings
Y = Economic growth
β_0 = Free term in the equation
β_1 = Economic growth to savings sensitivity coefficient
μ_2 = Random component

To assess the relation between economic growth and savings, two econometric models centred on the basis of Eq. 1 and 2 were used:

$$GDS_t = \alpha_0 + \sum_{t=1}^{n} \alpha_1 GDS_{t-1} + \sum_{t=1}^{n} \alpha_2 RGDP_{t-1} + \mu_{1,t} \quad (3)$$

$$RGDP_t = \beta_0 + \sum_{t=1}^{n} \beta_1 RGDP_{t-1} + \sum_{t=1}^{n} \beta_2 GDS_{t-1} + \mu_{2,t} \quad (4)$$

Where:

GDS = Gross National Savings (gross domestic savings in relation to GDP, as percentage)
RGDP = Real Gross Domestic Product (gross domestic product, percentage changes in fixed prices)
α, β = Sensitivity coefficient
μ = Residual component
t = Period of analysis
i = Number of variable delays

All the above mentioned time series had annual frequency and covered the 1980-2010 period. All the variables are expressed in logarithm form.

Data: The current study used annual data from 1980-2010. All data came from the statistical bulletin of the Central Bank of Nigeria, 2010. Variables used in this study and the definitions are LogGDS (log of Gross Domestic Savings) and LogRGDP (log of Real Gross Domestic Product). The aim of this study is to identify the causality between the two variables.

Estimation technique: This study employs the Granger causality and co-integration techniques to examine the relationship between savings and economic growth. This was after we verified the presence of the unit root. Standard tests of the presence of unit root based on the research of Dickey and Fuller.

RESULTS AND DISCUSSION

Empirical results: The ADF test in Table 1 shows that both logRGDP and logGDS have unit roots in the first difference, therefore there are unit roots and the variables are stationary.

The results of the unit root test point out that the variables are integrated at same order (I (1)); the next step is to check if the long run relationship exists between the variables of interest. If the sequence of residuals from this regression is stationary, the variables are said to be co-integrated of order (1, 1).

On the other hand, if these residuals are non-stationary, it is concluded that there is no long run equilibrium relationship or no cointegration lies between the variables. It is of major importance to note that the

Table 1: Results of the stationarity (unit root) test using Augmented Dicky-Fuller (ADF)

Variables	ADF test statistics	Critical values	Order of integration
LOGRGDP	-35.6556	1% = -3.6892	I(1)
	(0.0001)	5% = -2.9719	
		10% = -2.6251	
LOGGDS	-3.8137		
	(0.0072)	1% = -3.6793	I(1)
		5% = -2.9678	
		10% = -2.6230	

Table 2: Engle-Granger co-integration results

Coefficient	p-value	Order of integration	Decision
-13.321	0.000	I(0)	Cointegrated

Researchers' computation

critical values for the cointegration test (the ADF test on the residuals) are not the same as the standard critical values of the ADF test used for testing stationarity (Table 1 and 2).

Table 2 summerizes the results of co-integration analysis between Gross Domestic Savings (GDS) and Real Gross Domestic Product (RGDP) in Nigeria. Engle-Granger co-integration result identifies the existence of long run association, error term of both equations are stationary at level which reflects the evidence of cointegration (Engle and Granger, 1987). Thus, the presence of co- integration vector shows the existence of a long run equilibrium association between the variables.

Using Table 3, the decision rule for the test is where the value of the F-statistic is low and the probability value is high, the researchers reject the null hypothesis. On the contrary where the F-statistic value is high and the probability value low the researcher accept the null hypothesis.

Overall empirical results revealed that the growth rate of gross domestic savings Granger caused economic growth rate in Nigeria, therefore the researchers accept the Solow's hypothesis that savings precedes economic growth and reject the Keynesian theory that it is economic growth that leads to higher savings. This finding is in agreement with Bacha (1990), De Gregorio (1992), Cullison (1993), Jappeli and Pagano (1996), Krieckhaus (2002), Alguacil *et al*. (2004), Lorie (2007) and recently Oladipo (2009).

But, the finding is in disagreement with Sinha and Sinha (1996, 1998, 1999), Sinha (2000), Gavin *et al*. (1997), Saltz (1999), Agarwal (2001), Anoruo and Ahmad (2001) and Baharumshah and Abu (2010) which stated that economic growth rate Granger caused the growth rate of savings, thus reject the Solow's hypothesis that savings precedes economic growth and accept the Keynesian theory that it is economic growth that leads to higher savings.

Table 3: Pair wise Granger causality results

Null hypothesis	F-statistics	Probability
LOGGDS does not Granger cause LOGRGDP	1.34693	0.2875
LOGRGDP does not Granger cause LOGGDS	3.12636	0.0487

Researchers' computation

CONCLUSION

The primary purpose of this research was to investigate the relationship between the domestic savings and economic growth for Nigeria. Using time series annual data between 1980 and 2010. Granger causality tests were conducted. The objective was to determine the direction of causality in the country.

RECOMMENDATION

The empirical results suggested that the growth rate of domestic savings Granger causes economic growth rate in Nigeria. In this study, the direction of causality in the empirical results was unidirectional.

The government and policy makers should employ policies that would accelerate domestic savings so as to increase economic growth in Nigeria.

REFERENCES

Abu, N., 2010. Saving-economic growth nexus in Nigeria, 1970-2007: Granger causality and co-integration analyses. Rev. Econ. Bus. Stud., 3: 93-104.

AbuAl-Foul, B., 2010. The causal relation between savings and economic growth: Some evidence from MENA countries. Proceedings of the 30th Annual Meeting of the Middle East Economic Association, January 3-6, 2010, Allied Social Science Associations, Atlanta, GA, USA., pp: 1-12.

Agarwal, P., 2001. The relation between savings and growth: Cointegration and causality evidence from Asia. Applied Econ., 33: 499-513.

Alguacil, M., A. Cuadros and V. Orts, 2004. Does saving really matter for growth? Mexico (1970-2000). J. Int. Dev., 2: 281-290.

Anoruo, E. and Y. Ahmad, 2001. Causal relationship between domestic savings and economic growth: Evidence from seven African countries. Afr. Dev. Rev., 13: 238-249.

Bacha, E.L., 1990. A three-gap model of foreign transfers and the GDP growth rate in developing countries. J. Dev. Econ., 32: 279-296.

Blomstrom, M., R.E. Lipsey and M. Zejan, 1996. Is fixed investment the key to economic growth?. Q. J. Econ., 111: 269-276.

Carroll, C.D. and D.N. Weil, 1994. Saving and growth: A reinterpretation. Carnegie-Rochester Conf. Econ. Ser. Public Policy, 40: 133-192.

Cohen, D., 1997. A comment on Gavin, Hausmann and Talvi. In: Promoting Savings in Latin America, Hausmann, R. and H. Reisen (Eds.). Organization of Economic Cooperation and Development and Inter-America Development Bank, Paris.

Cullison, W.E., 1993. Savings Measure as Economic Growth Indicators. Contemp. Econ. Policy, Vol. 11. 10.1111/j.1465-7287.1993.tb00366.x.

De Gregorio, J., 1992. Economic growth in Latin America. J. Dev. Econ., 39: 59-84.

Deaton, A., 1995. Growth and Saving: What do we Know, What do we Need to Know and What Might we Learn? Princeton University, USA.

Dolado, J. and H. Lutkepohl, 1996. Making wald tests work for cointegrated VAR systems. Econ. Rev., 15: 369-386.

Engle, R.F. and C.W.J. Granger, 1987. Cointegration and error correction: Representation, estimation and testing. Econometrica, 55: 251-276.

Gavin, M., R. Hausmann and E. Talvi, 1997. Saving Behavior in Latin America: Overview and Policy Issues. In: Promoting Savings in Latin America, Hausmann, R. and H. Reisen (Eds.). Organization of Economic Cooperation and Development and Inter-America Development Bank, Paris.

Husain, A.M., 1995. Long-run determinants of private saving behaviour in Pakistan. Pak. Dev. Rev., 34: 1057-1066.

Jappeli, T. and M. Pagano, 1996. The determinants of saving: Lesson from Italy. Proceedings of the Conference on Determinants of Domestic Savings in Latin America, June 15-17, 1996, Inter-American Development Bank, Santafede Bogota.

Johansen, S., 1988. Statistical analysis of cointegration vectors. J. Econ. Dyn. Control, 12: 231-254.

Keynes, J.M., 1936. The General Theory of Employment, Interest and Money. Macmillan Cambridge University Press, Cambridge, UK.

King, R.G. and R. Levin, 1994. Capital fundamentalism, economic development and economic growth. Carnegie Rochester Conf. Ser. Public Policy, 40: 259-292.

Krieckhaus, J., 2002. Reconceptualizing the developmental state: Public savings and economic growth. World Dev., 30: 1697-1712.

Lewis, W.A., 1955. The Theory of Economic Growth. Unwin University Books, London.

Lorie, H., 2007. Mobilizing savings for sustainable high growth: Lesson from Asia for Pakistan. A Presentation at PIDE, Islamabad, Pakistan. http://www.pide.org.pk/pdf/seminar/seminar96.pdf.

Maddison, A., 1992. A long run perspective on saving. Scand. J. Econ., 94: 181-196.

Mavrotas, G. and R. Kelly, 2001. Old wine in new bottles: Testing causality between savings and growth. Manchester School, 69: 97-105.

Modigliani, F., 1970. The Life Cycle Hypothesis of Savings and Inter Country Difference in the Saving Ratio. In: Induction to Trade and Growth: Essay in Honor of Sir Roy Harrod, Eltis, W.A., M.F. Scott and J.N. Wolfe (Eds.). Clarendon Press, London, UK.

Modigliani, F., 1990. Recent development in saving rates: A life cycle perspective. Proceedings of the 6th World Congress of the Econometric Society, August, 1990, Barcelona, Spain.

Mohan, R., 2006. Causal relationship between savings and economic growth in countries with different income levels. Econ. Bull., 5: 1-12.

Oladipo, S.O., 2009. Does saving really matter for growth in developing countries? the case of a small open economy. http://economics.ca/2009/papers/0619.pdf.

Podrecca, E. and G. Carmeci, 2001. Fixed investment and economic growth: New results on causality. Applied Econ., 33: 177-182.

Sajid, G.M. and M. Sarfraz, 2008. Savings and economic growth in Pakistan: An issue of causality. Pak. Econ. Soc. Rev., 46: 17-36.

Saltz, I.S., 1999. An examination of the causal relationship between savings and growth in the third world. J. Econ. Finance, 23: 90-98.

Sinha, D. and T. Sinha, 1996. The role of saving in Pakistan's economic growth. J. Applied Bus. Res., 15: 79-85.

Sinha, D. and T. Sinha, 1998. Cart before the horse? The saving-growth nexus in Mexico. Econ. Lett., 61: 43-47.

Sinha, D. and T. Sinha, 1999. Saving and economic growth in Sri Lanka. Indian J. Applied Econ., 8: 163-174.

Sinha, D., 2000. Tests of granger causality between saving and economic growth in the Philippines. J. Social Econ. Dev., 3: 200-207.

Solow, R., 1956. A contribution to the theory of economic growth. Q. J. Econ., 70: 65-94.

Toda, H.Y. and T. Yamamoto, 1995. Statistical inference in vector autoregressions with possibly integrated process. J. Econ., 66: 225-250.

Vanhoudt, P., 1998. A fallacy in causality research on growth and capital accumulation. Econ. Lett., 60: 77-81.

Waithima, A.K., 2008. The egg or the chick first, saving or GDP growth: Case for Kenya. KCA J. Bus. Manage., Vol. 1.

World Bank, 1993. The east Asian miracle: Economic growth and public policy. Policy Research Report.