

# **Saving-Investment Relationship with Economic Growth during Financial Crisis in Nigeria**

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## ABSTRACT

The Global economic meltdown had called for a new model of managing and controlling of the banks and other financial institutions globally, after claiming thousands of jobs and over 120 banks across the world. This study aims to investigate the causal relationship between saving rates of Nigeria and real GDP growth especially over the period of 1980-2012 that includes the recent financial crisis. It is also the aim of the researcher to investigate the relationship between investment rate with real GDP growth during same period.

Unlike previous studies, this study implements Johansen co-integration Estimation as well as Granger Causality analysis. In this analysis, the hypothesis of existence of any long-run equilibrium relationship between savings - investment function is tested by using Johansen co-integration method for Nigerian economy during economic crisis. The short-run dynamics are also captured from the vector error correction model. The estimates of the Johansen co-integration model suggest that there is a long run relationship between savings and investment. This result is consistent with a number of previous studies that found saving and investment to be co-integrated in the long run. Granger causality test result draws a conclusion that there is a uni-directional causal relationship from investment towards savings in Nigeria, where savings turns into consumption especially for imported commodities.

**Keywords:** Savings, Investment, Gross Domestic Product (GDP)

## ÖZ

Küresel ekonomik kriz, global olarak, bankaların ve finansal kurumların yönetim seklillerinde yeni modeller ortaya çıkarmıştır. Bu çalışma Nijerya'daki tasarruf oranı ve reel gayri safi yurtiçi hasıla (GDP) artış arasındaki nedensel ilişkiyi araştırmayı amaçlamıştır, 1980'ten 2012'ye, şimdiki krizi içine alarak. Bu çalışma ile ayrıca yatırım oranları ve reel GDP artış arasındaki ilişkida aranmıştır, aynı zaman aralığında

Diğer çalışmalarda kinin aksine, bu çalışmada Johansen co-integration ve Granger nedensellik testleri kullanılmıştır. Bu analizde, olası uzun vadeli equilibrium ilişkisi aranmıştır yatırım ve tasarruf arasında , Johansen co-integration test kullanılarak ekonomik kriz suresi boyunca. Johansen co-integration medeli göstermiştirki, yatırım ve tasarruf arasında uzun süreli ilişki vardır. Bu çalışmadaki bulgu önceki çalışmalardakilerle tutarlıdır. Granger nedensellik testinin sonucuna göre, Nijerya'da tek yönlü bir nedensellik ilişkisi mevcuttur, yatırımdan tasarrufa. Nijerya da tasarruflar tüketime döner, özellikle ithal ürünler için

**Keywords:** Tasarruf, Yatırım, GDP.

This is dedicated to my loving and wonderful husband, Dr. Akwu Umar Goodman,  
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# Chapter 1

## INTRODUCTION

### 1.1 Background to the Study

The Global economic meltdown had called for a new model of managing and controlling of the banks and other financial institutions globally, after claiming thousands of jobs and over 120 banks across the world. Serven and Solinano (1993) carried out such a view that capital formation is a key to growth is reflected in the development strategies and plans of many countries.

Domestic investment is a catalyst necessary for the overall development of an economy (Abou-Strait, 2005). The primary objective of domestic investment policies in any economy is to increase the level of economic activities. Hence, domestic investment policies should be directed to the sector in which the impact of an increase in domestic investment demand will be both desirable and large. It is a source of foreign exchange earnings since trade transactions among nations are settled in foreign exchange.

Iyoha and Oriakhi (2002) pointed out that the Nigerian economy has been and is currently being characterized by a reasonable degree of openness; hence its performance can be enhanced through the development of the foreign sector. The Nigerian foreign sector is dominated by primary commodities which have basic characteristic of low price and income elasticity, low demand, instability in domestic

investment earnings and terms of trade. This mono-culture situation brought untold hardship on the people of the country. For instance, from 1970 to date, oil domestic exporting has constituted on the average of 90% of the total foreign exchange earnings.

Uniamikogbo (1996) has accentuated that the domestic investment of primary products, particularly agricultural products, accounts for a large proportion of Nigeria's non-oil domestic investment earnings. The range of traded non-oil merchandise is not only narrow but is made up of goods that are highly uncompetitive in the world market. Hence, Nigeria's share of the non-oil merchandise in the world market particularly manufactures, is relatively small (Uniamikogbo, 1996). According to Thirlwall (1978), the demand for developing countries' traditional domestic investment is inelastic relative to the demand for industrial goods. The domination of the domestic investment trade of Nigeria and other developing countries by primary products and the associated retardation of growth of traditional domestic investments has been attributed to three distinct factors at work in the developed countries. First, the global shift of the pattern of demand to goods with relatively low import content of primary commodities; second, technological change which has led to the development of synthetic substitutes of raw materials; and third, the pursuance of protectionist policies by the developed countries retarding the growth of imports of primary commodities and industrial goods.

Global economic meltdown is a situation in which the supply of money is outpaced by the demand for money. Pernia,(1998) highlighted that liquidity is quickly

evaporated because available money is withdrawn from banks, this forces banks to either sell other investments to make up for the shortfall or to collapse.

Adeyemi, (2009) stated that Nigeria is thrown into another challenge clearing by the apex financial regulatory agency, the Central Bank of Nigeria (CBN). He also noted that Nigerian banks experienced explosive balance sheet growth in the wake of consolidation by going on extensive capital raising spree which increased their capacity to lend to companies and individuals four years ago. Mbamalu, (2009) has noted that, the effects of the excess capital realized from the consolidation exercise and the global crises seriously exposed some of the banks after a series of audit exercise by the apex bank, which showed that some of the banks were not fit to continue running at the pace they were going; this resulted in the apex bank removing the entire directors of these banks and immediately appointing acting undertakers or managing directors, while most of the banks in a bid to cut down excess costs and retain customer loyalty, embarked on what they variously termed as rightsizing, downsizing or restructuring.

The contagion effects of the global economic crisis which originated in the collapse of USD 8 trillion US housing market bubble, has an immense and adverse impact on different countries and in different forms. It is clearly stated that recession is a period of general decline in the economy, this is usually referred to as a contraction in the GDP for six months (two consecutive quarters) or longer, characterized by increased unemployment, low wages, and fall in sales (retail), generally a recession does not last longer than one year and is much milder than an economic depression. Although recessions are seen as a normal part of a capitalist economy, there is no unanimity among scholars on its causes. Projections of Gross Domestic Product

(GDP) growth of developed economies and economies in transition published regularly provide a bleak picture about how the scenario could evolve in 2009.

Thirdwall, (1999) underlined the fact that there is a need to examine more closely the determinants of demand for Nigeria's non-oil domestic investments in the global market, especially as it has been observed that free trade may work to the disadvantage of the developing countries, largely because of the nature of the products these countries produce and trade under such system.

Empirical research will be used in this study and it aimed to investigate any possible savings/investment relationship with economic growth during economic crisis in Nigeria.

## **1.2 Problem of study**

Investment opportunities in Nigeria are in addition to the foregoing stifled by the increasing levels of uncertainties in the macroeconomic environment of doing business. For example, the shift in economic policies from one of the regulation to that of deregulation and back to that of guided deregulation with a yet possible return to regulation in some sectors of the economy. This explains all smacks of policy inconsistencies that have meted deleterious effects on the economy through disinvestments resulting from capital flight which it engenders. The global economic crisis had a negative impact on the investment sector in Nigeria.

The reverberating effects of the meltdown have been felt in the banking industry, the capital market and other vital sectors as exemplified by the collapse of investment, while rescue packages are being drawn up and interest rates cut across the world.

The economic meltdown has caused the crumbling of many businesses including otherwise formidable corporate giants across the world. In Nigeria, the crisis stumbled on the existing pervasive and convoluted business environment. At the pinnacle is an intractable power crisis. Other numerous factors stringent to business growth include rising cost of refined petroleum products, high interest rate, chaotic ports and intensifying crime rate.

### **1.3 Research Questions**

To address this problem, the study will answer the following questions.

- i. What effect savings and investment have on economic growth in Nigeria?
- ii. What impact does global financial instability make on the confidence of investors in the market?
- iii. What is the difference between previous investment and savings performance and the current performance due to economic crisis in Nigeria?

### **1.4 Objectives of the Study**

The broad objective of the study is to examine savings/investment relationship with economic growth during economic crisis in Nigeria. The following will be specifically addressed by this study:

- i. To ascertain the economic implication of savings and investment on economic growth in Nigeria.
- ii. To evaluate the impact of global financial instability on the confidence of investors in the market.
- iii. To evaluate the difference between previous investment and savings performance with the current performance due to economic crisis in Nigeria.

## **1.5 Significance of the Study**

One of the most topical issues in the country today or around the world at large is that of the global financial turmoil in the economy. This research is undertaken to bring out and envisage on the various objectives that can be of economic benefit for the country as a whole and as well to improve the function of savings/investment towards efficient and effective economic growth in Nigeria. An investor would want to know the viability of a company's financial statement before he can put his or her money.

It will be of significance to the government because savings/investment relationship with economic growth has become a major concern for political leaders, economists and soon around the globe. The government of a country is characterized as one whose utmost function and duties are to scramble for strategies to mitigate the impact of the crisis.

The creditors are people whom the business is indebted to, so they have to know how well the business or organization is doing to know well the funds are being utilized for the survival of the business. This is achieved by the creditors by simply requesting for the company's financial statement and assesses its performance in the financial year. This would be of great concern to most investors due to global economic meltdown. It is also of great importance to financial institution of the country as it serves as a control measure towards their functions and activities in fulfilling their responsibilities.



The study therefore seeks or hoped that those users will benefit from such information that will disclose in this study because this research will be carried out to accomplish the objectives of this study.

## **1.6 Statement of Hypothesis**

In order to achieve the objective, the following hypotheses are formulated as follows:

Ho1: There is no relationship between savings and investment and economic growth in Nigeria

Ho2: The impact of global financial instability does not affect the confidence of investors in the financial market in Nigeria

Ho3: There is no difference between previous investment and savings performance with the current performance due to economic crisis in Nigeria

## **1.7 Scope and Limitations of the Study**

The scope of this study is on savings/investment relationship with economic growth during economic crisis in Nigeria from 1980 to 2011. The scope of this study will be limited to economic crisis as it affects Savings and Investment in Nigeria. The study also revolves around the Nigerian stock exchange (NSE), the Securities and Exchange Commission (SEC).

The major limitation of the study experienced by the researcher was the problem of gathering large range of data, especially before the period of 1980, which posed a threat to the quality of this research.

## Chapter 2

### REVIEW OF RELATED LITERATURE

#### 2.1 Theoretical Review

The tremendous world economic growth that followed the “1950s and 1960s dismantling of investment barriers by developed countries” is evidence to investment as a primary device to growth. The embankment of investment policy as an approach to basic economic improvement by advanced nations in the 1970s and 1980s proved to be of great benefit as they experienced monumental growth.

The disagreement used for open investment is contained in the law of absolute advantage established by Adam Smith which was fine-tuned in the 18<sup>th</sup> century by David Ricardo as relative preference. According to Adam Smith "every nation may as well represent considerable authority in those merchandise or administrations in which it has comparable advantage". Iyoha (1995) states that the root of the established theory is that a country will tend to domestic investment the commodity whose comparative cost (the opposite of comparative advantage) is lower in autarky and import the goods of which the comparative cost is higher in pre-investment. The neoclassical theory of foreign investment was developed out of the need to modify some of the assumptions of the classical theory to provide more realistic information for the existence of differences in comparative costs between nations. This theory of investment, also known as the modern theory of external investment was developed by Eli Heckschar and Bertil Ohlin in the 1930s, the theory that is popularly known as

Heckschar Ohlin theory, assumes that investment arises from differences in comparative cost that in turn arises from inter-country differences in relative factor endowment or relative factor (abundance).

In contemporary times a number of theories have been propounded to modify aspect of the modern theory of investment. These may include the Linder theory of external investment (1961), the size and distance theory of external investment postulated by Linnemann and Tinbergen (1962) was applied to third world nations by Hla Myint. According to the theory of vent- for-surplus (Myint 1971), the opening of world markets to remote agrarian societies creates opportunities not to reallocate fully employed resources as in the traditional models but, rather, to make use of formally underemployed land and labour resources to produce greater output for domestic investment to foreign markets. The opening up of the nation to foreign market provides the economic impetus to utilize idle resources and expand primary product manufacturing thereby moving the economy towards its production possibility frontier.

## **2.2 Theoretical framework**

The theoretical framework adopted for this work is the “q theory” of investment which was initially introduced by Keynes (1936) and Brainard and Tobin (1968), and extended to models of investment assuming convex costs of adjusting the capital stock by Hayashi (1982). Their approach emphasizes equity prices and shifts attention away from the bond and money markets towards equity markets.

## **2.3 Theories of Economic Growth**

Different models have been applied to illustrate the theories of economic growth some of the earliest theories shall be examined in this study;

### **2.3.1 Harrod-Domar Growth Theory**

The Harrod-Domar growth Theory (Harrod, 1939 and Dormar, 1946) is based on the experience of capitalist economies and attempt to analyze the requirement for a steady growth. The theory attempts to discover the rate of income growth necessary for a smooth and uninterrupted working of an economy. This model indicates there is a direct link between the rate of economic growth and the level of current investment. The model assumes that output growth of the present year tallies with the investment ratio (the share of investment in output) in the previous year. This theory laid emphasis on the dual character of investment. Firstly, it creates wealth, and secondly, it enhances the beneficial limit of the economy by expanding its capital stock. Harrod-Dormar growth model are purely laissez-faire, taking into account economic objectivity and designed to indicate conditions of progressive equilibrium for an advanced economy.

Within this framework of Harrod-Domar model, a targeted rate of growth of output or GDP depends on a country's savings rate, capital/output ratio, and capital depreciation. This theory has often been criticized for three reasons. Firstly, it centres on the assumption of exogeneity for all key parameters. Secondly, it ignores the impact of technical change, and lastly it does not allow for diminishing returns when one factor expands relative to another. One key implication of this model is that the growth rate of the economy can be influenced by policy makers attempting to improve components of the growth rate. This means that by designing policies to

influence the savings rate or enacting policies to reduce the capital-output ratio say, by investment in human capital, the productivity of capital can be increased hence the growth rate of the economy can be considered a policy variable.

However, productivity of capital should be improved upon to reduce the pervasive poverty. The poor development execution has been to a great extent because of the communication of financial, political, social and institutional elements that have hampered the right conditions for productive investment to flourish. Most of the economic decisions are made by the government. For instance, the upward pricing of petroleum products has always been contentious in Nigeria.

### **2.3.2 Neo-Classical Growth Theory**

The neoclassical model, often called the Solow growth model (Sometimes called the steady state model) advanced by Solow (1957), later, this model relaxed some of the simplistic assumption of the Harrod-Domar models; this model has been criticized by Romeo (1986) and Schumpeter (2006) that it failed to offer a satisfactory account of the links between savings and growth which conforms to conventional wisdom that capital accumulation is the engine of growth. This model however assumes that countries use their resources efficiently and that there are diminishing returns to capital.

From the above principles, the model makes three important predictions: 1), expanding capital with respect to labour creates investment development, since individuals might be more gainful given more capital. 2), poor countries with less capital per person will grow faster because each investment in capital will produce a higher return than rich countries with ample capital. 3), due to consistent losses to capital, economies will inevitably achieve a focus at which no new increase in capital will create output or economic growth; this point is called the 'steady state'. This

model argues that growth can be achieved with technology and key input (Labour and Capital). It allowed for diminishing returns, perfect competition but not externalities. In the neoclassical growth process, savings were needed to increase capital stock, capital accumulation had limits to ensure diminishing marginal returns, and capital per unit of labour was limited. It postulated that growth also depended on population growth rate and that growth rate was supposed to converge to a steady state in the long run.

Countries can overcome this steady state and continue growing by investing in new technology that allows production with fewer resources. The basic problems associated with the neoclassical thinking are that it hardly explains the sources of technological change. The implication of this model is that the path and speed of an economy's growth are endogenous policy variables that are within the ambition of policy makers.

### **2.3.3 Endogenous Growth Theory**

Endogenous growth theory or the new growth theory was developed in the 1980's as a response to criticism of the neo-classical growth model. In neo-classical models, the long run rate of growth is exogenously determined by either assuming a savings rate or a rate of technical progress. However, the savings rate and rate of technological progress remain unexplained. Endogenous growth theory tries to overcome this shortcoming by making growth an endogenous variable. Several competing models have been developed by various authors like Romer (1986) and Schumpeter (2006).

Endogenous growth theories usually rely on vicious cycles, crucial importance is usually given to the "production" of new technologies and human capital. The motor

for development could be as basic as a constant return to scale production function or more complicated set ups with spill over effects, increasing number of goods and expanding qualities.

Endogenous growth model demonstrates that policy measures can have an impact on the long-run development rate of an economy. For instance, research and advancement subsidies, on education or the job training increases the growth rate in some endogenous growth models by increasing the incentive to innovate.

This model is also incorporated with a new concept of human capital; the abilities and learning that make labourers profitable. Unlike, physical capital, human capital has expanding rates of return. Generally, there are consistent returns to capital, and economies never achieve a steady state. Development does not abate as capital aggregates, yet the rate of development relies on upon the sorts of capital a nation puts resources into.

Research done in this area has focused on what increases human capital (e.g. education) or technological change (e.g. innovation). Recent empirical analyses by Romer (1986), Schumpeter (2006) suggest that differences in contrasts in cognitive aptitudes, identified with education and different elements, can generally illustrate varieties in development rates across countries. One of the main shortcomings of endogenous growth theories is the collective failure to explain the income divergence between the developing and developed countries and also the cornerstone assumption of diminishing returns to capital.

### **2.3.4 Concept and Nature of Financial Crisis**

The term financial crisis is applied broadly to a variety of situations in which some financial institutions or assets suddenly lose a large part of their worth. Different circumstances that are frequently called financial crisis incorporate stock exchange crashes and the bursting of other monetary air pockets, cash emergency and sovereign defaults.

The global financial and economic crisis presents significant challenges for African countries. It has also exposed weakness in the functioning of the global economy and led to calls for the reform of the international financial architecture. The crisis represents a serious setback for Africa because it is taking place at a time when the region is making progress in economic performance and management. The underlying assets during the 2008 financial crisis were the collapse of the securitized United States mortgage market and its related derivative products amplified the weakness of the United States economy and to the rest of the world.

Many economists have offered theories about how financial crisis developed and how they could be avoided. There is little accord, in any case and financial crisis are still a regular occurrence around the world.

### **2.4 Empirical Framework**

Empirical literature overwhelmingly suggests that increased investment or reduced protectionism is associated with more stunning advancement. Edwards (1998) represented that while considering the roles of all other factors including capital aggregation, development in labour force incorporating contrasts in level of innovation, nations with easier degrees of protectionism, on the normal have a



tendency to develop at a much quicker pace than nations with higher investment limitations.

Harrison (1991) synthesized previous empirical studies between openness and the rate of GDP development, thinking about the effects from cross area and board appraisals while regulating for nation impacts. The after effect of Harrison (1991) uncovered association crosswise over openness measures appear to be absolutely connected with GDP development. The more open the economy, the higher the development rate or the more secured the local economy, the slower the development in wage. More up to date especially the ones by Edwards (1992) and Dollar and Kraay (2001) show that investment is good for developmental growth. In a set traversing 100 nations, Dollar and Kraay (2001) have found that changes in development rates are exceedingly associated with progressions in investment rate. There have been various endeavors to relate investment policy variables to development rates. Dollar (1992), Edwards (1992) and Sachs and Warner (1997) have all found that investment openness is associated with more rapid development. These expectations were condemned by Rodriguez and Rodrik (1999) they questioned the results of the statistical works relating growth to open investment strategies. Essentially, Birdsall and Hamoudi (2002) have shown that the “increase in openness” variable used by Dollar and Kraay (2001) is subject to bias from capturing primarily effect of the erosion of world prices for raw material exports rather than any failure to open investment.

Fosu (1990) and Sachs and Warner (1997) agreed that investment restrictions have negative impact on growth especially for African nations, actually, Sachs and Warner (1997) found that lack of openness was the most significant contributor to the dismal

economic growth performance in sub – Saharan Africa. Guha – Khasnobis and Bari (2001) in their study found that openness measured by the Sachs – Warner criteria, accounted for majority of the differences in total factor productivity growth between East and South of Asia. They likewise discovered two obviously differentiating impacts of openness and growth which restricted investment regimes (in the sense of high duties), and they are absolutely connected with development while unhindered foreign investment regimes promote growth.

Balassa (1980) also noted that the proponents of the export – led growth strategy and free investment emphasizes in most developing the export – led growth hypothesis, this has a tendency to hold just for cross area studies. More recent proof on time series analysis cast doubts on the positive effects of exports on growth in the long run; see for details (Medina Smith, 2001). Krueger (1997) communicated in his work additional empirical demonstration of a strong association between export performance and economic growth by undertaking a comprehensive study of the role of exports on the economic growth of 10 countries from 1954 – 1974. A single non – linear regression equation was specifically estimated for each of the chosen countries and she found exports and GNP to be highly correlated, countries to follow more inward – oriented policies under the import substitution strategy especially, in Latin America had poor effects. This was brought up the resources Barro and Sala – i – Martin (1995) who showed in their study that between 1960 and 1990 some of the Latin American countries on the average exhibited a complete lack of growth with real income declining. This view was corroborated by Cline (2004) who also noted that the ultimate source of global poverty reduction is sustained economic development. Shafaeddin (1994) likewise worried that least developed countries particularly in Africa, have been progressively underestimated in foreign investment

mainly due to their high dependence on the production and export of primary products. The study discovered no agreeable deliberate companionship between exchange rate devaluation from one viewpoint, and development and enhancement of exports on the other hand. Shafaeddin (ibid) in his study attributes success or failure of GDP and mechanical development, to the volume of investment and the of accessibility of imports.

The conceptual framework employed in this study was adapted from the argument of Mahadevan (2003), where it was contended that the production frontier traces out the maximum output obtainable from the use of inputs that are accessible. In cognition of this research, the greatest domestic investment especially with regards to investment and international commerce is a function of the accessible input effectively converted into finished product as well as the political prosperity of the country. Mahadevan (ibid) emphasized that a production curve will only shift from its axis into a higher one as an aftereffect of specialized effectiveness, data development and innovative advancement, however, the part of the political climate in accomplishing this is so fundamental to be forgotten. For instance, the production curve will be unable to act maximally, actually when different things (e.g., specialized effectiveness, information development, and innovative advancement) are consistent in the vicinity of political turmoil. This is apparent in most African nations specifically Nigeria have seen moderate development, which had encountered times of lethal upsets, civil and political turmoil and so on.

Haberker (1961) highlighted on the importance of domestic investment to a nation, he also observed that domestic speculations create serious national goals. Ayal

(1982) comparably renowned investment issues confronted many nations, at a particular time, was connected by down home venture of these countries.

Iyanda (1982) debated that profits derived from domestic investment, may not be recognised if the businesses in emerging economy do not meet domestic demand first. The actuality still remains that for firm to develop domestically, they most likely have to offer their finished goods overseas.

Soludo pointed out in 2001 that external loans escalated Nigeria's debts to \$30 billion during the Babangida's regime and consumed external earnings. Continuing political instability due to Babangida's annulment of the presidential election results in June 1993 and the subsequent authoritarian rule of Sani Abacha (1993 to 1998) made by the general economic circumstance is more regrettable. The horrible defilement Abacha administration and its violations of people's fundamental rights turned Nigeria into an international outcast for 6 years, and subsequently affected remote investment in the economy. Numerous commercial enterprises and assembling organizations couldn't get raw materials and shut down. Others worked under intense impediment, including widespread force blackouts and refined petroleum scarcity. Military coups and administrative volatility aggravated the situation. This is to a large degree as a result of the high cost of business opportunities and the dearth of openness in making economic decisions (Soludo, 2001).

Unemployment amongst college graduates had risen from 30 to 40 percent in 2000. Aggravation of economic climate was on the rise due political doubts because of

ethnic and religious conflicts, and steady fight between the president and the legislators, (Soludo, 2001).

(Ogunkola, 2003) summarized that Nigeria's export involvement before the discovery of crude petroleum (oil) in the early 1950s was centred on the country's traditional farming, mining and other similar items. These items accounts for Nigerian primary tradable goods then, and constituted about 85 percent of entire profit. Nigeria budget analysis shows that promoting non-oil goods will cause a reduction on the nation's level of overdependence on crude oil.

Although theoretical links between investment and economic growth have been extensively discussed for some decades, respectable measures of conflicts still exist concerning their genuine effects. Medina-Smith, (2001) accentuated the arguments in favour of investment can be traced to the classical school of economic thought that started with Adam Smith. The avocation free of charge venture and the different unquestionable profits to countries have been significantly contended by (Bhagwati, 1978 and Krueger, 1978) in writing.

Besides endogenous growth theories, there have been some models that stretch the imperativeness of investment in attaining practical rate of economic growth. As Edwards and Obadan (2008) contended, some of such models are kept tabs on, distinctive variables, for example, the level of openness, true trade rates, duties; terms of venture and fare execution to check the speculation that open economies develop more quickly than those that are shut. While the nexus between venture and development lies with development models, it was also emphasized that speculation is stand out component of the variables which enter the growth equation. The backers

of the export – headed development speculation which is upheld by Medina-Smith, (2001) and Obadan, (2008) state that investment was really the fundamental motor of development around the Asian Tigers; specifically Hong Kong, Taiwan, Singapore and South Korea.

Mwaba (1999) also explained that African countries have not embraced investment liberalization in the manner that other improving locales had. Protectionists' measures have taken different structures incorporating taxes, quantitative confinements, trade controls and absolute import bans. New development scholars battle that accepted dissection had a tendency to reliably disparage the welfare expenses of protectionism since they disregarded the impacts of the presentation of new products on technological advancement, household processing and development connected with free venture. Mwaba (1999) also highlighted that while opening an economy to investment may not provide the desired brisk fix, the evacuation or unwinding of quantitative import and export confinements and bringing down of taxes might bring about an increase in export. The beginning of a worldwide economy introduced by all inclusive investment liberalization, require not spell fiasco for African economies as is generally feared.

It has been argued that accrual from investment is biased in favour of progressed industrialized nations, that foreign investment has adversely affected industrial development in the poorer nations and that contrary to expectations from classical investment doctrine – free investment has in reality accentuated international inequalities.

Contrarily as pointed out by Obadan (1994) some theorists have maintained the traditional position of the significant contribution of foreign investment as the development of primary trading nations, and that increases from universal specialization unite with additions from development. This intimated that remote venture could make great commitments to a nation's advancement. Venture was hence connected with budgetary improvement describing investment liberalization as a motor of development. Obadan (ibid) additionally underlined that through speculation, development might be enhanced far and away superior by means of true benefit trade divisions. Investment expedites specialisation and expanded division of work thus prompts expanded world yield. Mwaba (1999) notes that the issue of if investment and increased openness lead to high rates of economic growth is an age – old question which sustained the debate between pro – investments and protectionists over the years.

While the protectionist scholars contended that investment liberalization is detrimental to growth and could prompt weakening, new improvement scholars' battle that openness stimulates technological change by increasing domestic rivalry and competition which is thoroughly discussed by Porter (1990) and consequently expanded enhancement. Drawing from the works of both established and current speculations, Mwaba (1999) advanced a two nation – two goods model to explain gains from investment. The model predicts that protectionist measures as taxes or standards could accelerate lessened yield, send out development and generally speaking welfare. The suggestion here is that unhindered investment would tend to be associated with higher levels of growth.

Tupy (2005) stressed that it is hypocritical for African leaders to call for greater access to global markets while rejecting investment openness at home. She demands that it is additionally crushing toward oneself because domestic protectionism contributes to perpetuating African and Indian neediness by J. Bagwati (2013). Truth be told, studies demonstrate that countries with the greatest freedom to investment tend to grow faster than countries that confine investment (Krugman, 2013). In his various studies Obadan (2008), reprimanded the view that investment exhibits great potentials in influencing economic growth and poverty reduction around countries. This perspective is all in all recognized by (Mwaba, 1999 and World Bank, 2002) in the literary works.



## **Chapter 3**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

The study will basically focus on savings/investment relationship with economic growth during economic crisis in Nigeria. The study period also covers 1980 to 2012, and will be using time-series data analyses. The following headings are dealt with in this chapter: Research Approach, Research Instrument, Model Specifications and Estimation Techniques and Method.

#### **3.2 Research Approach**

The approach used in this research is basically on secondary source. This is regarded as to the plan, structure and strategy of investigation conceived so as to obtain answers research problems. It ensures that the required data are collected and accurate. Nevertheless, the data used in this study is secondary data taken from World Bank, Central Bank of Nigeria Statistical Bulletin and National Bureau of Statistics (NBS) Publications.

#### **3.3 Research Instruments**

In this research work, secondary method is used for the collection of data. Secondary method was chosen for this study because it is considered to be the most appropriate method for needed information at the least amount of time. However, this has been chosen among other instruments of data collection as the basic method of collecting data for this study because of some added advantage it has over other methods.

### 3.4 Model Specifications

According to Dollar and Kraay (2001), there is an econometric model reflecting a positive relationship between Investment and Economic Development in the developing economies. From the review of literatures and theoretical framework in the previous chapter, it is observed that there existed a causal link between Investment and Economic growth. In line with the theoretical model put forth by Dollar and Kraay (2001), the model adopted in this study is expressed below.

For the purpose of this study, the understated model will be used:

$$\Delta y_t = \beta_0 + \beta_1 \Delta x_t - \gamma (y_{t-1} - \alpha x_{t-1}) + E_t \dots \quad \text{Equation (2)}$$

In which the error term has no MA part and the co-integrating parameter in the error correction mechanism (ECM, the part in parentheses) is (1- $\gamma$ ). The equilibrium shows a long run proportionality between  $Y_t$  and  $X_t$  when both variables are measured in logarithms. That is:

$$Y_t - \alpha X_t$$

Suppose that in the steady state there is a constant rate of growth, say  $g$ . That is:

$$\Delta Y_t = \Delta X_t = g$$

Then the equilibrium relationship is  $Y_t - \alpha X_t = \frac{\beta_0 - \gamma(1-\gamma)}{\gamma}$

Next to test for unit roots and co-integration, the parameters are estimated by fitting the error correction model.

### 3.5 Estimation Techniques and Method

The empirical analysis is presented in the following stages: Unit root test, Co-integration vector error correction and Granger causality analysis. Basically, the idea is to ascertain the order of integrations of the variables and the number of times the variables have to be differenced to arrive at stationary. This enables us to avoid the

problems of spurious or inconsistent regression that are associated with non-stationary time series models.

Applying the ADF test to the residuals from the estimate of regression equation tests the hypothesis of co-integration. If the calculated  $t$ -value for the ADF are greater than the mackinnon critical values, the variables are considered to be stationary. If it is found to be significant then, the second step is followed whereby the residual from this static regression are used as an error correction term in the dynamic first difference regression estimation. If the error term is stationary then the variables are co-integrated; implying a long run equilibrium (non-spurious) relationship exist among the set of variables as expressed by the OLS equation.

The VEC model is used for analyzing the interrelation of time series and the dynamic impacts of random disturbances of the system of variables. It is adopted for this work because it is commonly used for forecasting systems of interrelated time series and for analyzing the dynamic impact of random disturbances on the system variance. Thus, the VAR model captures the feedback effects allowing current and past values of the variables (Savings and Investment) in the model. But, the estimation and inference processes are complicated by the presence of the endogenous variables which appear on both sides of the equation.

## Chapter 4

### DATA PRESENTATION AND ANALYSIS

#### 4.1 Data

Data regarding GDP/investment and savings are gathered from the sources of IMF financial statistics. Throughout this study annual data has been used covering the period 1980 – 2012. Firstly, the real values have been calculated and secondly natural logarithms have been taken for each data series. Lastly, the stationarity for each data series is calculated. In econometric analysis attempt is usually made in discovering and establishing existing relationship between the different economic variables involved in the analysis. To this effect this chapter would serve as an attempt to evaluate savings/investment relationship with economic growth during economic crisis in Nigeria. This shall be done through the use of regression analysis and unit root test. The computational device is the Econometric views (e-views) software program.

#### **Table 1:**

##### **VAR Lag Order Selection Criteria**

Endogenous Variables: LNSAVLNINV

Exogenous Variables: C

Date: 01/08/14 Time: 11:19

Sample: 1980-2012

Included Observations:

Lag	LogL	LR	FPE	AIC	SC
0	-7.526114	NA	0.006613	0.656973	0.751270
1	3.835650	20.37282*	0.003986*	0.149266*	0.432154*
2	7.165741	5.511876	0.004197	0.195466	0.666947
3	9.638168	3.751269	0.004722	0.300816	0.960890
4	10.13947	0.691444	0.006150	0.542106	1.390772

\* indicates lag order selected by the criterion

LR: Sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

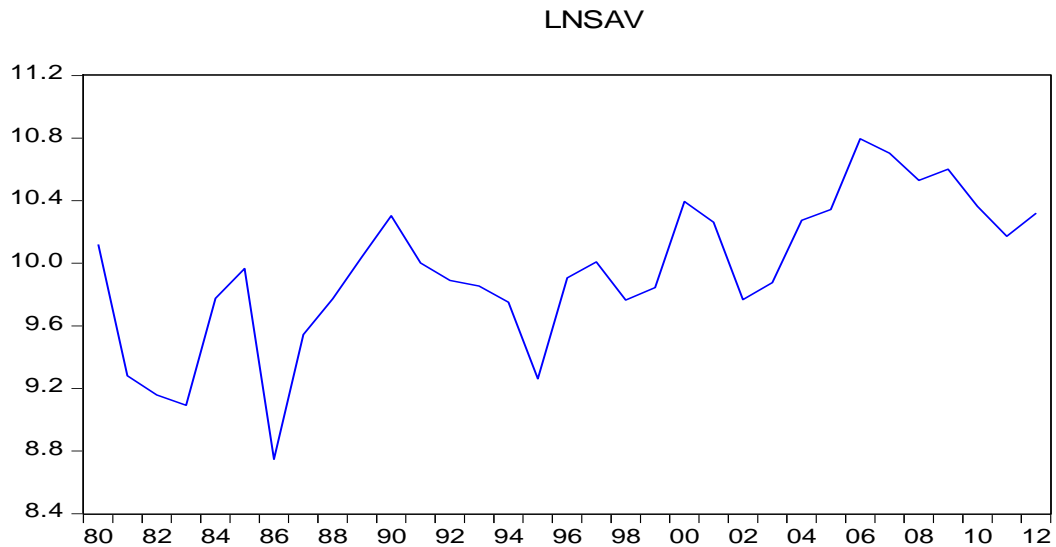
AIC: Akaike information criterion

SC: Schwarz information criterion

## 4.2 Lag Selection Procedure

Before preceding unit root, co-integration and vector error correction test, we investigated the most appropriate lag selections through applying VAR lag order selection criteria. Likelihood Ratio (LR), Final prediction Error (FPE), Log likelihood (LogL), Akaike information, Schwarz information and Hannan – Quinn information criteria have been separately calculated. 1 lag level have been commonly selected for a group of statistics. Following the lag order selection test savings/investment relationship with economic growth have been analyzed during the economic crisis in Nigeria. Vector auto-regression model is estimated from 1980 to 2012.

Figure 4.1. Savings Rate of Nigeria



Different systems are estimated in each period using alternate variables as measures of the cause of economic crisis. When results from the two estimation period are compared it is noted that both the responsiveness of savings and investment to policy shocks and the magnitude of their forecast error variance decompositions, explained by these variables, have increased during economic crisis in Nigeria.

The forecast-error-variances decompositions show that more of the variability in savings and investment are explained by shocks during economic crisis in Nigeria.

The savings rate of Nigeria in natural logarithm is labelled in Figure 4.1. It shows the effect of an unexpected one percentage point increase in savings as a result of changes in investment, as it works through the recursive VAR system with the coefficients estimated from actual data. This estimated impulse responses show patterns of persistent common variation. An unexpected fluctuation in savings trends upwardly over 33 years, and is associated with a persistent increase in investment.

Table 2. Results of ADF/Unit Root Test

Variable	ADF Lags	ADF test statistics	First Difference	Order of Integration
D (SAV)	2	$t_c = -2.617$	$t_{t,c} = -4.778$	1(1)
		$t_c = -6.243$	$t_{t,c} = -6.133$	1(1)
D (INV)	2	$t_c = -3.252$	$t_{t,c} = -4.477$	1(1)
		$t_c = 5.075$	$t_{t,c} = -4.958$	1(1)

Critical values 1%=3.679 5%=-2.967 10%=-2.622

### Savings

The computed Augmented Dickey Fuller Unit Root Test (ADF) or “tau” test-statistic tests (-6.243346) is greater than the critical values (-3.670170, -2.963972, -2.621007 at 10%, 5%, 1% significant level, respectively), therefore after taking the first difference we can reject the null hypothesis  $H_0$  that there is no unit root. It means the Savings series doesn't have a unit root problem and the Savings series is a stationary series at 1%, 10% and 5% significant level.

### Investment

The absolute computed ADF test-statistic (-5.075331) is smaller than the critical "tau", thus we can reject the null hypothesis that there is a unit root in the series. After taking the 2<sup>nd</sup> difference of the series, then it became stationary and it is therefore integrated of order 1(1). Therefore, we can conclude that both Savings and Investment series are non-stationary series, but the 2<sup>nd</sup> - difference or detrend would generate the stationary.

#### **4.2.2 Co-integration Tests**

In this analysis, the hypothesis of existence of any long-run equilibrium relationship between savings - investment function is tested by using Johansen co-integration method  $\Delta$ logy for Nigerian economy during economic crisis in Nigeria. Same was also implemented for savings function. If Savings / Investment function shows a possible long-run equilibrium relationship during economic crisis in Nigeria, then it means that the stochastic trend in savings is related to the stochastic trend in investment. Thus, by co-integrated variables, it will be constrained to equilibrium relationship in the long-run.

The Johansen method applies the maximum likelihood estimations to determine the presence of co-integrating vectors in non-stationary time series. The trace test and Eigen value test determine the number of co-integrating vectors. This implies stationary long-run equilibrium relationships between the variables. Table 1 [Savings to Investment] shows the trace and the maximum Eigen value tests using Savings and Investment According to these tests, for both Savings and Investment case the result have one co-integrating vector both statistically and economically significant at 5% significance level.





### 4.3.1 Vector Error Correction Analysis

The results for short-run dynamic vector error correction estimation revealed that every 1 percent increase in saving rate, causes 0.156 percent increase in real investment in Nigeria and the t-statistics for saving rate is found to be significant (1.81 and also it is inelastic. The error term shows that 175 percent disturbance have been eliminated between long-run and short-run estimations.

The coefficients of the variables (Savings and Investment) are statistically significant and have positive impact. The coefficient sign is found to be negative as expected. This further indicates that improvement in investment over the years has necessitated an increase in GNS (Gross National Savings).

Generally, the results obtained from the estimated equation revealed that the model is well-behaved and the explanatory variables explain well over 80 per cent of the variations in the dependent variable. This is adjudged by the value of the coefficient of determination ( $R^2$ ).

The R-Square is 0. 0.633515 and 0.766888, which suggests a positive relationship between Savings and Investment. The adjusted  $R^2$  of savings 0.236490 suggests that 24% of the total change in Savings can be attributed to Investment while the adjusted  $R^2$  of investment 0.514350 suggests that 51% of the total change in Investment can be attributed to Savings.

The F – statistics shows that the equation or model employed is statistically significant at a value of 1.595656 (savings) and 3.036724 (Investment) with p value (significant F = 0.00000) which means that the relationship between Savings and

Investment is statistically significant ( $\text{sig } f < 0.0500$  is statistically significant) The judgment and estimation is based on the independent variable as well as the appropriate expectation and the ratio will be taken into consideration.

#### 4.4 Granger Causality Tests

Table 5. Result of Granger Causality Test

Pairwise Granger Causality Tests			
Date: 01/08/14 Time: 11:48			
Sample: 1980 2012			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
LNSAV does not Granger Cause LNINV	31	4.98063	0.0148
LNINV does not Granger Cause LNSAV		0.38992	0.6810

Granger-causality test statistics with 2 lags reveals that at least one variable helps to predict another variable. Table 5 summarizes the Granger-causality results for the two variables VAR. It shows the p - values associated with the F-statistics for testing whether the relevant sets of coefficients are zero. Investment helps to predict savings at the 5% significance level (the p-value is 0.0148 or 1%). Therefore, we can draw a conclusion that there is a uni-directional causal relationship from investment towards savings in Nigeria.

There is supporting evidence that there is uni-directional causality found from investment to savings in Nigeria, where savings turns into consumption especially for imported commodities.

With our findings, there is a very strong consistency with the theory and a huge trade deficit in Nigeria trade balance validates our results.

## Chapter 5

### CONCLUSION AND POLICY RECOMMENDATION

This study is designed to evaluate savings/investment relationship with economic growth during economic crisis in Nigeria. Domestic investment poses lesser risk than external debt for the borrowing country, although the latter promises higher return. If an investment financed by external borrowing does not bring return, the country faces the same external claim as when the investment had turned out well. But if the domestic investment is not profitable, the recipient country shares the loss with the investor. In the same way, if the domestic investment is positive, the country will have to share some of its profit with the domestic investor.

Nigeria's domestic investment policy should move towards attracting more investors through market expansion. This leads to the fact that investment flows which would on a normal day have come from countries of surplus capital like Western Europe to capital deficient countries like Nigeria would now be going to poor European Economic Communities which includes Eastern Europe. With the variations in domestic investment, Nigeria needs to improve her domestic investment, in order to keep greater level of earnings. Foreign investment cannot add much to the economic development of Nigeria when linked to only capital supply than to ventures.

In conclusion, with the Federal government's aim to see to an atmosphere for local investment, the legislature should understand that for a successful development,

domestic investment should be encouraged, considering the fact that they add to the bulk of investment activities in the country.

## **5.1 Policy Recommendations**

The following strategies are thus proposed to policy makers and government since domestic investment contributes to the growth and development of Nigeria.

The Nigerian government should encourage domestic investors through creating transparency in the operations of domestic companies within the economy.

The Nigerian government should create a more pleasant business environment, which will, attract domestic investors into almost all the sectors of the economy.

The government needs to enhance the infrastructural facilities to enable the domestic investors function well.

Human capital investment should be supported as well.

Nigerian government should fully engage in the liberalization of all the sector of the economy in order to attract both domestic and public investors.

For Nigeria to have more domestic and foreign investments, efforts should be made at managing the issues of government association with external image which involves seriousness and openness in the battle against degradation.

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## **APPENDIX**

Null Hypothesis: D(LNSAV) has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic - based on SIC, maxlag=2)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.243346	0.0000
Test critical values: 1% level	-3.670170	
5% level	-2.963972	
10% level	-2.621007	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNSAV,2)

Method: Least Squares

Date: 01/08/14 Time: 11:23

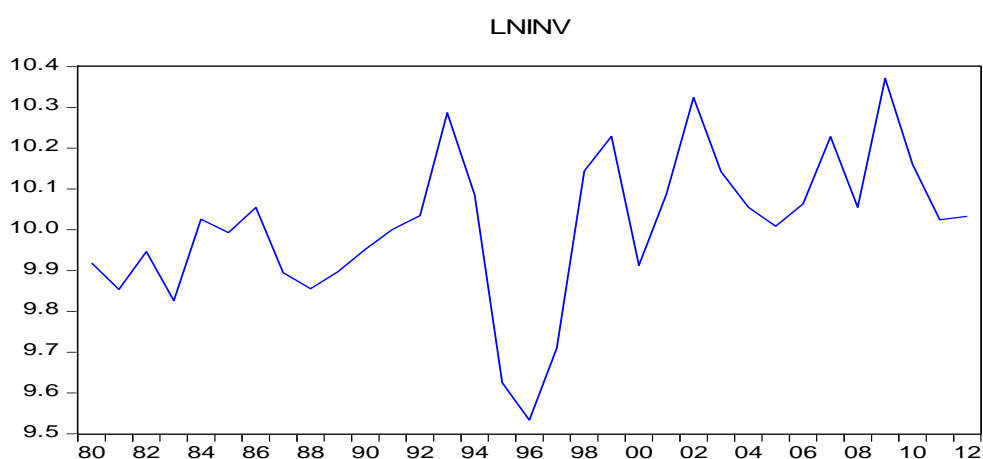
Sample (adjusted): 1983 2012

Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNSAV(-1))	-1.636556	0.262128	-6.243346	0.0000
D(LNSAV(-1),2)	0.345954	0.164879	2.098233	0.0454
C	0.050184	0.069202	0.725176	0.4746



R-squared	0.667190	Mean dependent var	0.009050
Adjusted R-squared	0.642537	S.D. dependent var	0.631861
S.E. of regression	0.377778	Akaike info criterion	0.985620
Sum squared resid	3.853339	Schwarz criterion	1.125740
Log likelihood	-11.78430	Hannan-Quinn criter.	1.030445
F-statistic	27.06369	Durbin-Watson stat	2.155343
Prob(F-statistic)	0.000000		



Null Hypothesis: D(LNINV) has a unit root

Exogenous: Constant

Lag Length: 2 (Automatic - based on SIC, maxlag=2)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.075331	0.0003
Test critical values: 1% level	-3.679322	

5% level	-2.967767
10% level	-2.622989

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\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNINV,2)

Method: Least Squares

Date: 01/08/14 Time: 11:24

Sample (adjusted): 1984 2012

Included observations: 29 after adjustments

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Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNINV(-1))	-1.880059	0.370431	-5.075331	0.0000
D(LNINV(-1),2)	0.730478	0.270795	2.697526	0.0123
D(LNINV(-2),2)	0.347235	0.191937	1.809107	0.0825
C	0.016997	0.034120	0.498158	0.6227

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R-squared	0.624726	Mean dependent var	0.004425
Adjusted R-squared	0.579693	S.D. dependent var	0.281616
S.E. of regression	0.182574	Akaike info criterion	-0.435875
Sum squared resid	0.833336	Schwarz criterion	-0.247283
Log likelihood	10.32019	Hannan-Quinn criter.	-0.376810
F-statistic	13.87266	Durbin-Watson stat	2.025936
Prob(F-statistic)	0.000016		

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## COINTEGRATION TESTS

### SAVING TO INVESTMENT

Date: 01/08/14 Time: 11:32

Sample (adjusted): 1982 2012

Included observations: 31 after adjustments

Trend assumption: Linear deterministic trend

Series: LNSAV LNINV

Lags interval (in first differences): 1 to 1

#### Unrestricted Cointegration Rank Test (Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.512492	26.81045	15.49471	0.0007
At most 1 *	0.136193	4.538571	3.841466	0.0331

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

#### Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.512492	22.27187	14.26460	0.0022

At most 1 \* 0.136193 4.538571 3.841466 0.0331

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Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by  $b'S_{11}^{-1}b=I$ ):

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LNSAV	LNINV
-1.775285	7.002741
2.017171	1.635416

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Unrestricted Adjustment Coefficients (alpha):

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D(LNSAV)	0.058353	-0.135746
D(LNINV)	-0.131173	-0.010072

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1 Cointegrating                      Log  
Equation(s):                      likelihood      5.766104

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Normalized cointegrating coefficients (standard error in parentheses)

LNSAV	LNINV
1.000000	-3.944574
	(0.67004)

Adjustment coefficients (standard error in parentheses)

D(LNSAV) -0.103593

(0.12717)

D(LNINV) 0.232870

(0.04469)

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## INVESTMENT TO SAVINGS

Date: 01/08/14 Time: 11:34

Sample (adjusted): 1982 2012

Included observations: 31 after adjustments

Trend assumption: Linear deterministic trend

Series: LNINV LNSAV

Lags interval (in first differences): 1 to 1

### Unrestricted Cointegration Rank Test (Trace)

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Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.512492	26.81045	15.49471	0.0007
At most 1 *	0.136193	4.538571	3.841466	0.0331

---

---

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.512492	22.27187	14.26460	0.0022
At most 1 *	0.136193	4.538571	3.841466	0.0331

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by

$b'S_{11}b=I$ ):

LNINV	LNSAV
-7.002741	1.775285
-1.635416	-2.017171

Unrestricted Adjustment Coefficients (alpha):

D(LNINV)	0.131173	0.010072
D(LNSAV)	-0.058353	0.135746

1 Cointegrating

Log

Equation(s):

likelihood

5.766104

Normalized cointegrating coefficients (standard error in parentheses)

LNINV	LNSAV
1.000000	-0.253513
	(0.06347)

Adjustment coefficients (standard error in parentheses)

D(LNINV)	-0.918571
	(0.17630)
D(LNSAV)	0.408630
	(0.50162)

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## VECTOR ERROR CORRECTION TESTS

Vector Error Correction Estimates

Date: 01/08/14 Time: 11:36

Sample (adjusted): 1982 2012

Included observations: 31 after adjustments

Standard errors in ( ) & t-statistics in [ ]

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Cointegrating Eq:	CointEq1
LNINV(-1)	1.000000
LNSAV(-1)	-0.253513
	(0.06347)

[-3.99403]

C -7.493148

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Error Correction:	D(LNINV)	D(LNSAV)
CointEq1	-0.918571 (0.17630) [-5.21038]	0.408630 (0.50162) [ 0.81463]
D(LNINV(-1))	0.341270 (0.15053) [ 2.26714]	-0.574906 (0.42830) [-1.34230]
D(LNSAV(-1))	-0.097545 (0.06957) [-1.40201]	-0.100672 (0.19796) [-0.50855]
C	0.004778 (0.02518) [ 0.18974]	0.035632 (0.07165) [ 0.49734]
R-squared	0.519699	0.095068
Adj. R-squared	0.466333	-0.005480
Sum sq. resids	0.530489	4.294710
S.E. equation	0.140170	0.398827
F-statistic	9.738260	0.945494

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Log likelihood	19.06603	-13.34974
Akaike AIC	-0.972002	1.119338
Schwarz SC	-0.786971	1.304369
Mean dependent	0.005782	0.033491
S.D. dependent	0.191876	0.397739

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Determinant resid covariance (dof adj.)	0.003115
Determinant resid covariance	0.002363
Log likelihood	5.766104
Akaike information criterion	0.273155
Schwarz criterion	0.735731

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#### Vector Error Correction Estimates

Date: 01/08/14 Time: 11:41

Sample (adjusted): 1988 2012

Included observations: 25 after adjustments

Standard errors in ( ) & t-statistics in [ ]

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Cointegrating Eq:	CointEq1
LNINV(-1)	1.000000
LNSAV(-1)	-0.277877 (0.03305)

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[-8.40740]

C -7.225962

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Error Correction:	D(LNINV)	D(LNSAV)
CointEq1	-1.750698 (0.81388) [-2.15105]	3.885840 (1.95759) [ 1.98501]
D(LNINV(-1))	1.173100 (0.69681) [ 1.68354]	-3.040118 (1.67599) [-1.81392]
D(LNINV(-2))	0.699970 (0.63284) [ 1.10608]	-2.781583 (1.52214) [-1.82742]
D(LNINV(-3))	0.666907 (0.53097) [ 1.25602]	-1.751656 (1.27711) [-1.37158]
D(LNINV(-4))	0.220650 (0.43937) [ 0.50220]	-1.757143 (1.05679) [-1.66272]

D(LNINV(-5))	0.807587	-0.780449
	(0.37833)	(0.90998)
	[ 2.13462]	[-0.85766]
D(LNINV(-6))	0.019309	-1.277612
	(0.29319)	(0.70520)
	[ 0.06586]	[-1.81171]
D(LNINV(-7))	0.272120	0.157332
	(0.25990)	(0.62512)
	[ 1.04703]	[ 0.25168]
D(LNSAV(-1))	-0.140194	0.509567
	(0.16811)	(0.40435)
	[-0.83395]	[ 1.26023]
D(LNSAV(-2))	-0.167867	0.284054
	(0.17399)	(0.41849)
	[-0.96480]	[ 0.67875]
D(LNSAV(-3))	0.046842	0.321031
	(0.15239)	(0.36653)
	[ 0.30738]	[ 0.87586]
D(LNSAV(-4))	-0.023267	-0.209381

	(0.14489)	(0.34850)
	[-0.16058]	[-0.60081]
D(LNSAV(-5))	0.101362	-0.265681
	(0.12768)	(0.30711)
	[ 0.79385]	[-0.86509]
D(LNSAV(-6))	0.007108	-0.356614
	(0.12331)	(0.29660)
	[ 0.05764]	[-1.20233]
D(LNSAV(-7))	-0.156956	-0.174457
	(0.08630)	(0.20758)
	[-1.81867]	[-0.84044]
C	-0.014046	0.112605
	(0.03543)	(0.08521)
	[-0.39649]	[ 1.32147]
<hr/>		
R-squared	0.855587	0.600773
Adj. R-squared	0.614899	-0.064604
Sum sq. resids	0.146086	0.845144
S.E. equation	0.127404	0.306439
F-statistic	3.554754	0.902906
Log likelihood	28.80696	6.865593

Akaike AIC	-1.024557	0.730753
Schwarz SC	-0.244476	1.510833
Mean dependent	0.005513	0.031032
S.D. dependent	0.205303	0.296996

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Determinant resid covariance (dof adj.)	0.001295
Determinant resid covariance	0.000168
Log likelihood	37.70775
Akaike information criterion	-0.296620
Schwarz criterion	1.361051

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#### Vector Error Correction Estimates

Date: 01/08/14 Time: 11:37

Sample (adjusted): 1982 2012

Included observations: 31 after adjustments

Standard errors in ( ) & t-statistics in [ ]

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Cointegrating Eq:	CointEq1
LNSAV(-1)	1.000000
LNINV(-1)	-3.944574
	(0.67004)
	[-5.88706]

C 29.55727

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Error Correction:	D(LNSAV)	D(LNINV)
CointEq1	-0.103593 (0.12717) [-0.81463]	0.232870 (0.04469) [ 5.21038]
D(LNSAV(-1))	-0.100672 (0.19796) [-0.50855]	-0.097545 (0.06957) [-1.40201]
D(LNINV(-1))	-0.574906 (0.42830) [-1.34230]	0.341270 (0.15053) [ 2.26714]
C	0.035632 (0.07165) [ 0.49734]	0.004778 (0.02518) [ 0.18974]
R-squared	0.095068	0.519699
Adj. R-squared	-0.005480	0.466333
Sum sq. resids	4.294710	0.530489
S.E. equation	0.398827	0.140170
F-statistic	0.945494	9.738260
Log likelihood	-13.34974	19.06603
Akaike AIC	1.119338	-0.972002

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Schwarz SC	1.304369	-0.786971
Mean dependent	0.033491	0.005782
S.D. dependent	0.397739	0.191876

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---

Determinant resid covariance (dof adj.)	0.003115
Determinant resid covariance	0.002363
Log likelihood	5.766104
Akaike information criterion	0.273155
Schwarz criterion	0.735731

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#### Vector Error Correction Estimates

Date: 01/08/14 Time: 11:44

Sample (adjusted): 1987 2012

Included observations: 26 after adjustments

Standard errors in ( ) & t-statistics in [ ]

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Cointegrating Eq:	CointEq1
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LNSAV(-1)	1.000000
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LNINV(-1)	-3.792948
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	(0.55449)
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	[-6.84039]
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C 28.00712

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Error Correction:	D(LNSAV)	D(LNINV)
CointEq1	-0.853187 (0.31814) [-2.68176]	0.290050 (0.15790) [ 1.83693]
D(LNSAV(-1))	0.443421 (0.34477) [ 1.28615]	-0.054747 (0.17111) [-0.31995]
D(LNSAV(-2))	0.203302 (0.30990) [ 0.65603]	-0.033606 (0.15381) [-0.21849]
D(LNSAV(-3))	0.274095 (0.29324) [ 0.93470]	0.208846 (0.14554) [ 1.43497]
D(LNSAV(-4))	-0.084463 (0.26326) [-0.32084]	0.145295 (0.13066) [ 1.11204]
D(LNSAV(-5))	-0.106086 (0.22206)	0.246156 (0.11021)

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			[-0.47773]	[ 2.23349]
D(LNSAV(-6))	-0.131300	0.100200	(0.17344)	(0.08608)
			[-0.75703]	[ 1.16402]
D(LNINV(-1))	-2.814615	0.455661	(1.01536)	(0.50394)
			[-2.77204]	[ 0.90420]
D(LNINV(-2))	-2.477797	0.000279	(0.93390)	(0.46351)
			[-2.65316]	[ 0.00060]
D(LNINV(-3))	-1.766521	0.060538	(0.79610)	(0.39511)
			[-2.21897]	[ 0.15322]
D(LNINV(-4))	-1.727345	-0.290440	(0.67339)	(0.33421)
			[-2.56514]	[-0.86903]
D(LNINV(-5))	-1.025342	0.301949	(0.48895)	(0.24267)
			[-2.09705]	[ 1.24428]

D(LNINV(-6))	-1.079864	-0.253226
	(0.49420)	(0.24528)
	[-2.18508]	[-1.03241]

C	0.131321	-0.039036
	(0.06751)	(0.03351)
	[ 1.94519]	[-1.16503]

---

R-squared	0.633515	0.766888
Adj. R-squared	0.236490	0.514350
Sum sq. resids	0.982137	0.241926
S.E. equation	0.286085	0.141988
F-statistic	1.595656	3.036724
Log likelihood	5.697173	23.91145
Akaike AIC	0.638679	-0.762419
Schwarz SC	1.316116	-0.084982
Mean dependent	0.060460	-0.000839
S.D. dependent	0.327407	0.203746

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Determinant resid covariance (dof adj.)	0.001415
Determinant resid covariance	0.000301
Log likelihood	31.60310
Akaike information criterion	-0.123315
Schwarz criterion	1.328335

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GRANGER CAUSALITY TESTS:

Pairwise Granger Causality Tests

Date: 01/08/14 Time: 11:48

Sample: 1980 2012

Lags: 2

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Null Hypothesis:	Obs	F-Statistic	Prob.
<hr/>			
LNINV does not Granger Cause			
LNINV	31	4.98063	0.0148
<hr/>			
LNINV does not Granger Cause LNSAV			
		0.38992	0.6810

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Pairwise Granger Causality Tests

Date: 01/08/14 Time: 11:48

Sample: 1980 2012

Lags: 2

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Null Hypothesis:	Obs	F-Statistic	Prob.
<hr/>			
LNSAV does not Granger Cause			
LNSAV	31	0.38992	0.6810
<hr/>			
LNSAV does not Granger Cause LNINV			
		4.98063	0.0148

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