PENSION CONTRIBUTIONS AND NATIONAL SAVINGS IN GHANA; TRENDS, PROSPECTS AND CHALLENGES

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DECLARATION

This is to certify that this thesis is the result of research undertaken by CHARLES MENSAH towards the award of a Master of Philosophy (M.PHIL) degree in the department of Economics, University of Ghana.

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ABSTRACT

World Bank report (2010) clearly reported a continuous increase in old age dependency ratio and a sharp decline in fertility rate. The disparity of child birth between the early 1960s and the 2000s has caused many people to be found in the old age group. Now, the kind of pension scheme operating in Ghana is the Pay as you go scheme (PAYG) and the sustainability of the scheme depends on increasing working population. The problem is how the fewer young people under the PAYG scheme can take care of the many old generation without breaking down the scheme

Meanwhile, studies suggest that mandatory pension scheme increases savings but we have recorded decreases in Ghana's national savings though SSNIT operates the mandatory pension scheme.

The objectives of the study are; to examine the trends in pension contributions and national savings in Ghana, to establish the relationship between pension contributions and national savings, and to identify the prospects and challenges in the pension industry.

The Overlapping generation model used in the study. The study employed the Ordinary Least Squares to establish the linear relationship and the Vector Error Correction Model as the estimation technique.

Results from the study indicated that one of the predominant challenges facing the scheme are insufficient monthly benefit. Also from the secondary data results, interesting findings like a percentage unit increase in financial deepening will cause a decrease in national savings and a positive correlation between pension contribution and savings. It was suggested from the findings that SSNIT should increase the monthly benefits of pensioners, so that consumption will be smoothened during the days of retirement.

DEDICATION

This thesis is dedicated firstly to God, then to my parents: Mr. Francis Kingsley Mensah-Aborampah and Mrs. Philomena Buadoo. The thesis is also dedicated to Mr. Osu-Tei, a manager at SSNIT pension house, and to the National Pensioners Association, Ghana.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Human beings generally seek means to enhance their economic security. One main cause of economic insecurity is the probable reduction of an individual's earning power at an advanced age (Allen et al. 1966). The issue of old-age security has become an issue of great universal concern affecting richer and poorer countries across the globe. Across the globe, the pension system in many countries has come under pressure. In most dramatic cases, there has been an effective default of pension promises, throwing many older people into poverty (Valdes-prieto, 1997).

Population statistics in Ghana have shown a continuous rise in the old-age dependency ratio. The 2010 population census indicated that the old age dependency ratio in Ghana was 6.62 which indicated the gradual rise from 5.18 since 1967 (World bank report,2010). The steady but not steeply rise is as a result of the continuous growth in population of the old-aged dependents. Fertility rates have also been declining over the years with people giving birth to fewer children as compared to the baby-boom age in the 1960s. This baby-boom cohorts have now reached their old age with smaller cohort of the working class to cater for them. With this increasing frequency, there are concerns that most of the population will enter retirement with inadequate resources (Gustman et al.1998). As the long-term consequences of population aging have become known and more widely discussed, the financing of entitlement programs in public social insurance systems has received considerable attention (Samwick, 1999).

The early pensions program in Ghana (Cap 30) which was a form of loyalty rewarding programme has been reformed several times to the present pension programme, the three- tier pension scheme. The collapse of the traditional extended family system where the aged was catered for was due to economic hardships leading people to migration to the urban areas.. This consequence has led to the government introducing pensions programmes to cater for the old.

In Ghana, the public pensions programme has evolved around the two basic types of pensions; Defined Contribution and Defined Benefits. The former is a type of pension scheme where the firm (employer) contributes into an established savings account for the employee as pension benefit when the employee retires. An example of the Defined Contribution in Ghana is the Cap 30 where the government contributed into an account for its European and non-European workers. On the other hand, a Defined Benefit is a type of pension scheme where the employer is obliged to provide specified annual retirement benefits that are based on a formulae that takes into account years of service and the level of salary or wage. An example from Ghana's experience is the Social Security. Out of this two basic types of pension schemes are various kinds of pension programmes namely; Fully funded scheme, Pay-as-you-go(PAYG) schemes, Buffer fund, Means tested fund and Universal pension. The PAYG scheme is where the current working class pays payroll taxes to finance the current pension retirees.

However, in Ghana, the pensions system has evolved around the PAYG and the Fully Funded schemes. The Social Security and National Insurance Trust collected a total of GHS 576.833 million in contributions for 2010. This shows a decline of 13.60% over the figure collected in the preceeding which was GHS 667.60 million. The decline is attributed to the challenges that accompanied the introduction of the New Act and the new Business process that improved the

quality of data information received which employers were slow to comply with (SSNIT report,2010).

Though the Social Security Scheme was designed to be a PAYG scheme, the contributions of the current workers in that scheme was not totally consummed by the current pensioneers, rather part of if were invested into products like equities, fixed incomes,real estates, Ecobank Trans-national Incorporated (ETI) and others. This from the 2010 SSNIT report has caused the fund to grow from 0.88% in 2004 to 2.99% in 2010. Due to the diversification of investments practised by SSNIT, there is a need to look at the savings vehicles through which an individual can save and invest in Ghana.

1.2 Problem statement

The pension sector performs very useful roles in the economy of Ghana. In the pursuance of its social insurance functions, it tends to raise the levels of investments in the economy and also raise national savings through the partial Pay as you go (PAYG) system that is run in the country. Funds are mobilized from the working class and channel them to the economy as investments and benefits to the aged. By so doing, they encourage mandatory saving and ensure that that the aged in the country do not become a burden to the community but an asset.

World Bank staff estimates (2010) reports that, Ghana population statistics have continuously shown an increase old-age dependency ratio and defined old age dependency ratio as the ratio of population with ages 65 and above to the total population of Ghana. Fertility rates in Ghana have also been declining greatly over the years with people giving birth to fewer kids as compared to

the early years of Ghana's independence. The disparity of child birth between the early 1960s and the 2000s has caused many people to be found in the old age group. Now, with the kind of pension scheme operating in Ghana (PAYG), the sustainability of the scheme depends on increasing working population.

The problem is how the fewer young people under the PAYG scheme can take care of the many old generation without breaking down the scheme. Therefore, we need to know how we would grow our pension contributions through investments in order to sustain the scheme and also give a comfortable retirement.

Savings in developing nations have some common characteristics of low performance even though economic activities like mining, oil drilling and farming in dorminant. For the past three decades, savings has reduced drastically in Sub-sahara Africa and Latin America although it has doubled in Eastern Asia and other developed nations during that same period (Nwachukwu and Odigie, 2009). This is of a major concern since there is a strong correlation between savings and economic growth (Bremang, 2012). In Ghana, a third of all households own savings accounts, and out of this, two-fifth of these savings accounts are owned by the urban households whiles only twenty two (22%) of these accounts are owned by the rural folks (Ghana Statistical Service, 2008)

Determinants of savings like real interest rate, foreign savings, pensions, and so on, have existed as components of savings in Ghana. Murphy and Musalem (2004) suggests that increases in pension funds increase national savings when pension funds are the result of a mandatory pension programme. So a question now arises are ;

- What is the trends in pension contribution in Ghana?

- What is the effect of pension funds on national savings?
- What are the prospects and challenges of the pension scheme in Ghana?

Knowing the trends in the pension contributions will help us know and project the trend of investment by Ghana's major investor, Social Security and National Insurance Trust (SSNIT). Also if we know the relationship between the pension contributions and national savings, it will inform policy makers on policies that deals with pensions and promote national savings.

1.3 Objectives

The main objective for the study is to examine how pension contributions affect national savings in Ghana.

The specific objectives are as follows;

- To examine the trends in pension contributions and national savings in Ghana
- To establish the relationship between pension contributions and national savings.
- To identify the prospects and challenges in the pension industry.

1.4 Significance of the study

Murphy and Musalem (2004) conducted an empirical research on the effect of the accumulation of pension fund on national savings and found out that, this depends on whether the fund is mandatory or voluntary. It is suggested that increases in pension funds financial assets increase national saving when pension funds are the result of a mandatory pension program (Murphy and Musalem, 2004). There have been contradictory conclusions about the relationship between pension and savings.

Feldstein (1996) reports that the total effect of the pay as you go programme was to reduce personal savings by approximately $484 billion. Boyle and Murray (1979)researched on Canada and considered the relationship between pension and savings, and finds a negative relationship. Yamada (1992) did a similar research on Japan, whiles Makowski and Palmer (1979) researched using data of Sweden and found a negative relationship between savings and pension.

On the other hand, Kune (1981), Kopits and Gotur (1981) used data of Netherlands and fourteen Organisation for Economic Co-operation and Development (OECD) nations respectively and found a positive relationship between savings and pension.

Therefore the study seeks to find the relationship between pension fund and national savings in Ghana's context since its operates a mandatory kind of public pension scheme.

Also, there are few literature on the relationship between pension and national savings in Sub-Sahara Africa and this study tends to contribute to broaden the literature base in this respect.

1.5 Organization of the study

The study will be organized into six chapters. The first chapter highlights on the background of study, problem statement, objectives and significance of the study. Chapter two illuminates on the overview of the pension systems in Ghana. A critical review of the literature is carried out in chapter three which comprises of both theoretical literature and empirical literature. Out of this extensive literature review, the theoretical framework will be established for the research in chapter four. The fifth chapter of this research study elaborates on the presentation and discussion of results from this study. The final chapter will give vivid summary, conclusion and recommendations.

CHAPTER TWO

OVERVIEW OF THE NATIONAL PENSIONS SCHEMES AND SAVINGS IN GHANA

2.1 Introduction

In the previous chapter, several types and kinds of pensions were highlighted. This has generated major evolutions in the industry. This chapter will give a brief overview of the pensions systems in Ghana, that is, the history of pension contributions in Ghana. The chapter also expatiates on reasons why the pension industry always keeps growing. Also, the institutions responsible for pensions in Ghana were mentioned and their activities outlined.

2.2 The History Of Pension Plans In Ghana

In the past, Ghana had a rich history of the traditional system of social security which existed among the rural folks long before independence. This ensured that the extended family had a responsibility of taking care of the aged, the infirm and the finances that arise as a result of the demise of contributor or a pensioner of the scheme. The advent of modern society that is highly migratory and the introduction of social security have greatly disrupted the extended family system of pension plan(Dei, 1997). The gap created is that some people who are not formally employed by government and have migrated from their rural inhabitants to the city fall between the traditional extended family system of pensions and the social security offered by government.

In Ghana, majority of our population fall in the informal sector of the economy and the challenge is to design schemes to cater for the needs of this broader sector of the population. The introduction of formal pensions in Ghana dates back in the colonial era when the British

government introduced pensions for a select group of civil servants who were known as pensionable officers.

Kpessa (2010) finds that, "the first program was designed as a means of encouraging loyalty and efficiency within the colonial civil service". This retirement benefit was not one that was carved from deferred incomes by the retiree but rather it was seen and considered as a reward for people who served the Queen and the colony diligently till their old age. Thus, public servants had no entitlement to such programs unless they were judged by colonial administrators as meeting eligibility requirement of loyalty (Government of Ghana, 2006). The income protection policy was introduced to only urban dwellers who were Europeans and some few Africans in the colonial Bureaucracy (Asamoah and Nortey, 1987). The Old age income protection policy that was working during the colonial era was accompanied with the introduction of the Colonial Development and Welfare Act in 1940s (Darkwa, 1997).

Later, a Pension Ordinance was enacted by the British government to replace and unify the Pensions (European Officer) Ordinance (CAP-29, 1936) and the pensions (Non-European Officer) Ordinance(CAP-30. 1936) into a single non-discriminatory pensions scheme that offered equal benefits to both expatriates and local workers during this era (Government of Ghana, 2006). In its unified form, the scheme was referred to as CAP-30. This name was derived from chapter 30 of the 1950 Pension Ordinance (Kumado and Gockel, 2003). Because this scheme was seen as one that did not involve any contribution, it was meant for workers who have been loyal to their work and without blemish for at least ten years in service. With the CAP-30, employee could take a voluntary retirement at age forty-five or a compulsory retirement

at age fifty. This scheme created a lot of inconvenience for the British government since it was fully financed by the government.

Due to the financial burdens inherent in the scheme, policy makers in the immediate post independence years opted for the establishment of a new and different pension scheme known as Provident funds in 1965 for all categories of workers that were not covered by the CAP 30 scheme (Kpessa, 2010). Government established a more improved national scheme to cover all workers for both the private and public sector of the economy.

The term provident fund refers to a pension plan under which retiring workers received lump sum benefits in the form of financial assets build up over a period of time through membership contributions and investment returns (Dixon, 1989, 1993, 2000). This was a type of defined contribution since the employer (government) contributes funds to the scheme, but the employee bears all the risk of the fund's investment performance. Under this arrangement "an individual's pension is annuity whose size, at any given life expectancy and rate of interest, is determined only by the size of his or her lifetime pension accumulation" (Barr, 2002). The Provident Fund provides a lump sum payment for old age, invalidity and survivors benefits. During this period, the funds generated from the contributions were invested in special government bonds with very low interest rates and very long maturity periods.

Mkandawire (2001) argued that between the late 1950s and the early 1970s, the state was a developmental one in the sense that it was unified; it demonstrated autonomy from social forces, and prioritized human welfare over digitally measured growth by harnessing domestic resources

for development. Madavo (2005) also noted in the 1960s, economies in Africa including Ghana witnessed robust growth, and infrastructure, education and health were given maximum priority. Between the mid 1970s and 1982, the rate of domestic savings fell from 12% to 3%, the rate of investment fell from 14% to 2% of GDP, the government deficit increased from 0.4% to 14.6% of total government spending, the volume of import fell by two-thirds, real export earnings did not only drop by one-half, the ratio of Ghana's export to GDP fell from 21% to a low of 4%, income per capita dropped by 30%, and real wages by 80% (Boafo-Arthur, 2001). The joint economic losses that struck the nation at that time led to a hyperinflation of about 123% in 1983. (Dorkenoo, 2006; Konadu-Agyemang ,2001).

As a result of low interest rates and the rising inflation at the time, the lump sum benefits due to retiring beneficiaries were meaningless. "Following the negative impact of the economic crisis on the provident funds, the labor unions demanded the conversion of the provident funds to pay-as-you-so (PAYG) social insurance that to pay regular monthly benefits to retirees".(Kpessa, 2010).

Later in the 1990s, government converted the problematic provident fund to a social insurance that enabled pensioners to receive monthly installments instead of the lump sum. (Government of Ghana, 1982). Under this new scheme, workers were asked to contribute at least 240 months (20 years) to the scheme to qualify for retirement benefits. "Individuals who retire before the mandatory retirement age are paid reduced benefits". (Darkwa, 1997; Government of Ghana, 2006; Kumado and Gockel, 2003). Workers who were under the Provident Fund were

automatically enrolled in the new social insurance scheme and "Individuals who attained the retirement age at the exact date of the transition were given the option to choose between monthly benefits and lump sum payment, and pension entitlements were extended to employees who aged 55 (the retirement age under the provident funds) with less than 240 of months participation but more than 180 months contribution to smoothen the transition process" (Dei, 1997). The scheme was designed in a way that it considered the three main contingencies; old age/retirement, invalidity/disability and dependents/ survival's benefits. The compulsory old age retirement was pegged at 60years while the voluntary retirement was also placed at 55 years.

Kpessa (2010) finds that "Benefits are calculated on the basis of 50% of the average of an employee's three best years' salary. Employees are awarded an additional 1.5% on top of the 50% minimum base pension formula for every additional year of contribution or participation in the scheme beyond the 240 months up to a maximum pension benefit of 80% of the best three years' income". Adjei (2000) and Osei (2005) also added their voice to this topic by finding that if an employee is not able to contribute for the total of 240 months before retirement will receive his or her accumulated contributions with interest that is calculated at half the rate of the government's treasury bills.

For the disability benefit, in order to qualify, the employee should have contributed not less than three years to the scheme and must be medically proven by the medical board incapable of working again. Disability benefits are usually paid in monthly installment to the pensioner and lump sum payment to nominated beneficiary if the pensioner is deceased. Kpessa (2010) reports in his research on "The politics of retirement income security policy in Ghana: Historical

trajectories and transformative capabilities" that "Dependents of deceased employees who contribute to the scheme for a total of 240 months or more receive lump sum benefits equivalent to twelve years monthly retirement income. Under the social insurance scheme, if an employee passed away before reaching the 240 month contribution threshold, the dependent receives a lump sum benefit equivalent to 12 years retirement income proportional to the contributions made. In the event that a pensioner passes away before age 72, his/her dependent are paid lump sum benefit calculated up to the age 72 of the deceased retiree while dependents of a deceased pensioner aged 72 and over are not entitled to any benefit" (Dei, 1997; Dorkenoo, 2006; Osei, 2005).

The Government of Ghana also reported in 2006 that in 1991 when this scheme was introduced the total number of active members were about 647,712. Social Security and National Insurance Trust in 2006 also reported that by the close of that year the active members increased to 1,211,620 members, which is an 87.06% percentage increase within the fifteen years of establishment and at the close of that year the scheme recorded a total contribution of 2,868 billion old cedis. With this type of insurance, the employee contributes 5% whiles the employer contributes 12.5% forming a total contribution of 17.5%. "The most distinguishing feature of the social insurance plans has to do with the fact that it ensures inter-generational transfers and designed to ensure solidarity and collectivization of risks" (Kpessa, 2010). Funds or contributions from the scheme are invested in various sections of the economy like financial, manufacturing, services, residential (real estate), and commercial properties. Generally, the investment portfolio of the scheme is divided into fixed and non-fixed income investments. The fixed income investments include registered stocks, home finance company index linked bonds,

fixed deposits, call monies, student loans, corporate loans, treasury bills and government bonds and most of these investments are mostly short term. "Non-fixed income investments are economically targeted investment such real estate, commercial and residential, development and equities. These usually have long gestation period and are venerable to market fluctuations (Kpessa, 2010). Osei (2005) and SSNIT (2006) also collectively ascertained that by the end of 2006 the scheme had equity holdings in more than 53 companies in which some are listed on the stock market. "Actuarial evaluation of the scheme in 2004 projected that, at 2% rate of returns on investment and 3% annual increase in contributors; the scheme can be sustained over a fifty-year (2004-2054) period" (Kpessa, 2010). The running of two of the nation's pensions scheme brought some level of dissatisfaction. Kumado and Gockel (2003) also reported emphatically that; "Clearly, retirement benefits under CAP 30 are undoubtedly better than those under the SSNIT scheme, which is why those who can keep themselves in the plan do so, and others outside it are fighting to get on it. The problem is not only that there is great dissatisfaction among those workers who do not enjoy the superior coverage of CAP 30; it is also that the largely unfunded nature of the plan is a drain on general revenue."

In July 2004, The President of Ghana appointed a nine member presidential commission on pensions, chaired by one T.A. Bediako, to examine existing pension shceme(s) that will ensure retirement income security for Ghanaian workers. The Bediako Commission submitted its final report to government in March 2006 and the main recommendation of the commission is the creation of a new contributory three-tier pension system for Ghana comprising two mandatory and a voluntary scheme. It is out of this recommendation that brought to the complete phase out of CAP 30.

Agbobli (2010) also talked about the full operation of the Three Tier Pension Scheme in Ghana. Further light was thrown on the Three Tier Pensions Scheme as three separate sources one can save towards ones retirement. This pensions reform introduced had its firm grounds from National Pensions Act,2008 (Act 766). The new scheme consists of three strong investment vehicles which are geared to bring comfort to the pensioner or there beneficiaries and they are arranged as follows;

- First Tier mandatory basic national security scheme which will incorporate an improved system of SSNIT benefits mandatory for all employees in both the private and public sector(no lump sum payment, only monthly pensions and related benefits such as survivor benefit.)
- Second Tier occupational pension scheme, mandatory for all employees but privately managed and designed primarily to give contributors higher lump sum benefits than presently available under the SSNIT or Cap 30 pensions schemes.
- Third Tier voluntary provident fund and personal schemes, supported by tax incentives. It is pertinent to note that this 3rd tier voluntary personal pensions seeks to address the needs of workers in the informal sector of the economy of the working populace.

With this type of pension scheme, the employer contributes 13% and the employee contributes 5.5% making a total of 18.5%. This creates a 1% increment in contribution from the old social security scheme. This additional increment was shared among both the employee and the employer. Though the 1% additional increment looks quantitatively small, the benefits are much higher and more rewarding. The benefits of this retirement scheme are monthly pension income,

lump sum payment, invalidity benefits, survivor benefits and a favorable tax exemption from investments.

2.3 Institutions Of The National Pension Scheme

The first established of pension institution by government to regulate contributions and benefit payment was the Social Security and National Insurance Trust in 1965. The mandate of SSNIT has changed to administering of the First Tier Basic Scheme in a form of a Pay as you go scheme. Currently the National Pensions Regulatory Authority (NPRA) regulates the entire the entire administration of pensions in Ghana. Also, with the establishment of the New Three Tier Pension Scheme, private financial institution who have been given the mandate to serve as Trustees and Pension Fund Managers have joined the pension industry and are regulated by the NPRA. This section briefly describes the two government agencies in the pension industry, their functions and their objectives.

2.3.1 The National Pensions Regulations Authority (NPRA)

This is a body that was established in 2008 under Act 766 of the constitution of Ghana. The Act 766 is to provide pension reforms for Ghana by introducing a contributory Three Tier Scheme. This Authority was established to oversee the administration and management of registered pension schemes and trustees of the scheme. NPRA is liable to sue and can be sued since it is a corporate body. The main objective of this body is to regulate and monitor the operations of the scheme and ensure the effective administration of pensions in the country. NPRA performs the following functions. Table 1 clearly outlines the functions of NPRA

Table 1: Functions of NPRA

Functions of the Authority	
1.	be responsible for ensuring compliance with this Act
2.	register occupational pension schemes, provident funds and personal pension schemes
3.	register occupational pension schemes, provident funds and personal pension schemes;
4.	issue guidelines for the investment of pension funds
5.	approve, regulate and monitor trustees, pension fund managers ,custodians and other institutions that deal with pensions as the custodians and other institutions that deal with pensions as the
Authority may determine	
6.	establish standards, rules and guidelines for the management of pension funds under this Act;
7	establish standards, rules and guidelines for the management of pension funds under this Act
8.	regulate the affairs and activities of approved trustees and ensure that the trustees administer the registered schemes
9.	regulate and monitor the implementation of the Basic National Social Security Scheme

10.	carry-out research and ensure the maintenance of a national data bank on pension matters
11.	sensitise the public on matters related to the various pension schemes
12.	receive and investigate complaints of impropriety in respect of the management of pension schemes
13.	promote and encourage the development of the pension scheme industry in the country
14.	receive, and investigate grievances from pensioners and provide for redress
15.	advise government on the general welfare of pensioners
16	advise government on the overall policy on pensions in the country
17	request information from any employer, trustee, pension fund manager or custodian, any other person or institution on matters related to retirement benefit
18	charge and collect fees as the Authority may determine
19.	impose administrative sanctions or fines
20.	perform any other functions that are ancillary to the object of the Authority

Source; National Pensions Act, ACT766

2.3.2 The Social Security And National Insurance Trust (SSNIT)

SSNIT has been administering pension funds in Ghana since 1965. It first started administering Provident Fund for formal workers in Ghana until a bill was passed in 1991 which converted the

Provident Fund to the Pay as you go scheme. The aim of the conversion was to provide better social income protection (Gockel, 1996).

SSNIT has about 1,051,429 members contributing to the scheme and 119,323 pensioners benefiting from the scheme (SSNIT report, 2012). SSNIT now operates at all the ten regional offices in Ghana. This institution operates under two main lines; that is the administrative section and the investment sections (Gockel, 1996). The object of the Trust is to operate the basic national social security scheme referred to as the social security scheme and other schemes as determined by law on the recommendations of the National Pensions Regulatory Authority.

SSNIT receives financing from the contributions and the return on investment on the contributions. Investment by SSNIT is in the areas of Equities, Fixed income, and Real estates (SSNIT report, 2012).

Challenges Faced By SSNIT In The Administration Of The Scheme

SSNIT, a body responsible for the Pay as you go scheme, faces some administrative problems that hinder the progress of the industry. This section of the study illuminated the main challenges that is faced by the administrators of the mandatory basic contribution.

- Delay in contribution payment by government

Government, the largest contributor to the SSNIT scheme most often delay in payment of the contributions for the government and this causes SSNIT to delay in its projects and investment. It is almost impossible for SSNIT to force government to pay, since some board members and the Director General are appointed by government and are part of government. Government sometimes also delays in the payment of loans from SSNIT and this causes some sort of difficulty for the scheme. A table below shows the indeptedness position as at the end of December 2012 at SSNIT

Table: 2 Arreas Position as at December 2012

ARREAS POSITION AS AT DEC. 2012		
TYPE OF ESTABLISHMENT	GH S MILLION	PERCENTAGE OF TOTAL
Indebtedness of private establishment (Gen)	48.46	9.6
Indebtedness of private with spread branches	17.64	3.5
Indebtedness of Controller and Accountant General	386.55	76.3
Indebtedness of subvented organization	37.29	7.4
Indebtedness of Government Finance	16.83	3.3
TOTAL	506.77	100.0

Source : 10TH Annual Performance Review Conference (SSNIT), April 2013

- Also, as reported in the SSNIT 2010 annual report, the reduction of the total contribution, available to SSNIT has been a challenge to the scheme. Instead of 17.5%, the Trust now receives only 11% for its operations. Actuarial studies have also shown that if there was not an increase in the number of contributors, the SSNIT fund could find itself in some serious financial difficulties.

Objectives Of Pension Institutions Under The New Pensions Act 766

Table 3 below contains the main objective of the bodies that will ensure the smooth and efficient running of the Three Tier Pension Scheme under the authority of the ACT 766. The NPRA being the regulatory body, have a responsibility of monitoring all the other bodies mandated to manage the scheme. SSNIT is the second largest body in the pension industry in Ghana and they have been mandated to manage the compulsory First Tier contribution which is made up of the 13.5% of the 18.5%. out of the protion managed by SSNIT, 2.5% also goes to insure the members of the scheme. The Trustees and Fund Manager one chooses, are responsible for administering and growing the 5% of the fund which is the occupational scheme. They may also be appointed by the employee to manage the personal private pension scheme.

Table 3: The Pension Institutions And Their Main Objective In Ghana

PENSION INSTITUTION	CENTRAL OBJECTIVE
National Pensions Regulatory Authority	The main objective of this body is to regulate and monitor the operations of the scheme and ensure the effective administration of pensions in the country.
Social Security and National Insurance Trust	The object of the Trust is to operate the basic national social security scheme referred to as the social security scheme and other schemes as determined by law on the recommendations of the National Pensions Regulatory Authority

The Trustees	Responsible to oversee the administration of the second tier and third tier schemes
The Fund Managers	Manage the growth of the funds from the occupational scheme and the personal private pension scheme.

Source; ACT766 (2008)

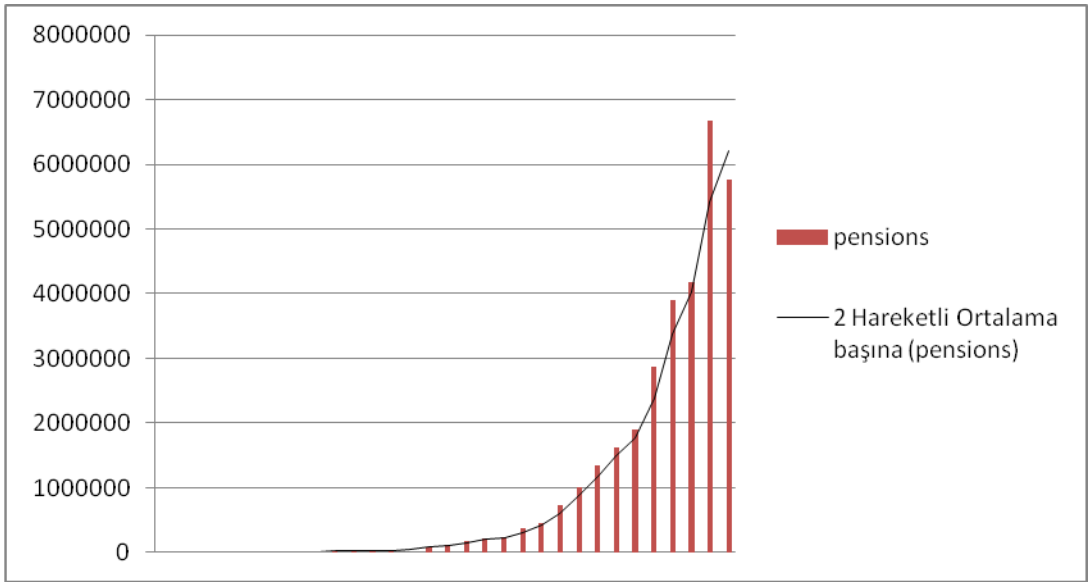
2.4 Trends Of Pension Contributions In Ghana

Analyzing pension contribution that span for about thirty years shows an interesting trend as is shown the figure two. From the period of 1980 to 1983, the SSNIT scheme received contributions in terms of hundreds of cedis. This occurrence may be as a result of political and economical instability that Ghana was faced with at that time. One way of increasing the the pension contribution is through the increase of productivity among firms but this was not the case during that period since firms were folding up , many lacked sufficient raw materials to increase productivity and the political instability also lead many people fleeing their jobs to seek shelter elsewhere. From the period of 1984 to 1988, contributions increased to column of thousands of old cedis. This increase in contribution can be accounted for as a result of stability in governance and the economy during that people. Also, during that period, the Social Security and National Insurance Trust (SSNIT) increased the awareness of the pension scheme by having seminar workshops with employers and employees across the length and breadth of the country. This education brought about clarity of the scheme and also contributed to the growth of the scheme during the period of 1984 to 1988. As people came to understand the scheme,

contributions increased to tens of thousand cedis and jumped further to hundreds of thousands in cedis from 1995 to the early 2000s.this continuous rise in trend in the period of 1990s was as a result of tax expemtion advantage enjoyed by both employer and employee. Allen *et al*. (1966) explains that, to the employer, the avoidance of tax paid on contribution makes the employer "happy". Also, employees are happy because they benefit of savings without tax deductions till the day of withdrwal. This makes it a win-win affair for both the employer and the employee. In 2009, the SSNIT scheme received the highest contribution of ¢6,670,000.this was as a result of the competitiveness of the labour market at that time. In a free, competitive labour market, an employer with pension plans has the tendency of attracting prospective employees. This is because employers who are embarking on this plan are considered as employee friendly. Therefore, employers without his plan are at a competitive disadvantage in attracting and holding personnel. Attracting more prospective employees who may be skilled will cause productivity to increase and will also cause the pension plan to grow.

However, the fell in 2010 as a result of the introduction of the three tier scheme which limits SSNIT to control only 11% of the contribution. Also, awareness and sensitization of the new pension scheme was low causing employers and employees to drag their feet in payment. Figure 1 displays a graphical representation of the trend in contribution from 1980 to 2010

Figure 1: SSNIT Pension contribution :1980 -2010

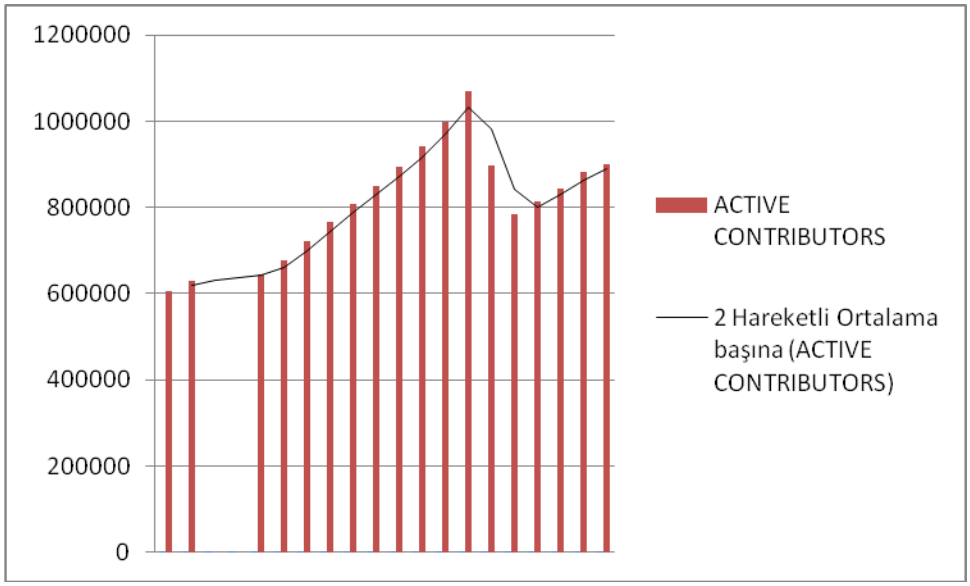


Source: Author's computation from the SSNIT data (2013)

The increasing awareness of the SSNIT pension scheme, has caused a continuous increase in the number of pension contributors. In 1991, the scheme had about six hundred thousand contributors and this gradually continued to increase to about a million contributors in 2004. However, in 2005 and 2006, contributors decreased by about 20% to 30% and recorded about seven hundred thousand active contributors in the scheme.

Membership number began to rise again in 2007, till it hit the institutions target of one million again in July 2012. Data on the membership strength for 1993 t0 1994 was not available from SSNIT. Figure 2 shows the trend in growth of contributors form 1991 to 2010

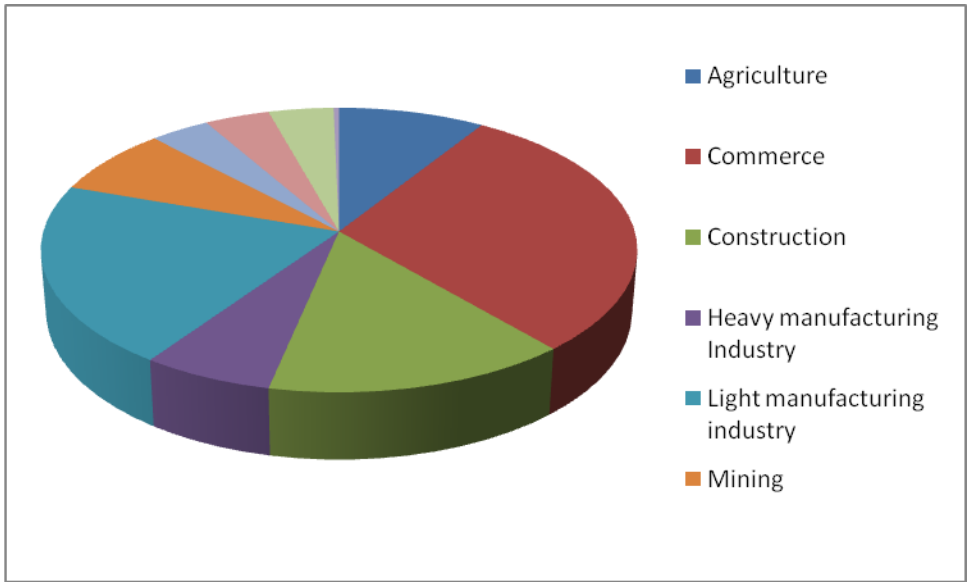
Figure 2 : Trend In Membership



Source : SSNIT annual report from 1991-2010

The pie chart below shows how the various economic sectors in Ghana contribute to the pension fund. With active contributors for the year 2009 as 880,760, the Commerce sector of the economy were the major contributors of the scheme, followed by the manufacturing industry. The Construction, Agriculture, Mining, Service, Transport, and Power sectors all lie above 1% whiles the Domestic assistance sector contribute on 0.1% to the fund. Figure 3 show the proportions of pension contributions by the various sectors in the economy.

Figure 3 : Sector contribution to SSNIT scheme



Source: SSNIT report (2009)

2.5 Savings in Ghana

Savings in Ghana are from two main source; public sector and the private sector. Therefore, national savings are the compositions of savings from the public sector and the private sector. The public sector comprises of government agencies that collect monies in forms of tarrifs and taxes for efficient and equitable redistribution of resources in the economy. These monies help in the developmental projects for the country.

The private sector is also made up of domestic household and private businesses in the country. As individual always face the challenge of how much to and save in order to continue consumption smoothening, government also face faces similar challenges in allocation monies for consumption and national savings. Financial intermediaries have been established in most parts of the country making it easy and comfortable to save. These financial institutions include

financial institutions and non financial institutions. Non financial institution include the NPRA, SSNIT, Insurance companies and so on whiles financial institutions in Ghana include, Banks, microfinance companies, Stock Exchange Commision (SEC) and Brokerage firms.

The formal sector of the Financial Institution consist of about twenty six Banks,and theinformal sector consist of susu operators and other traditional savings operators (Bremang, 2012).

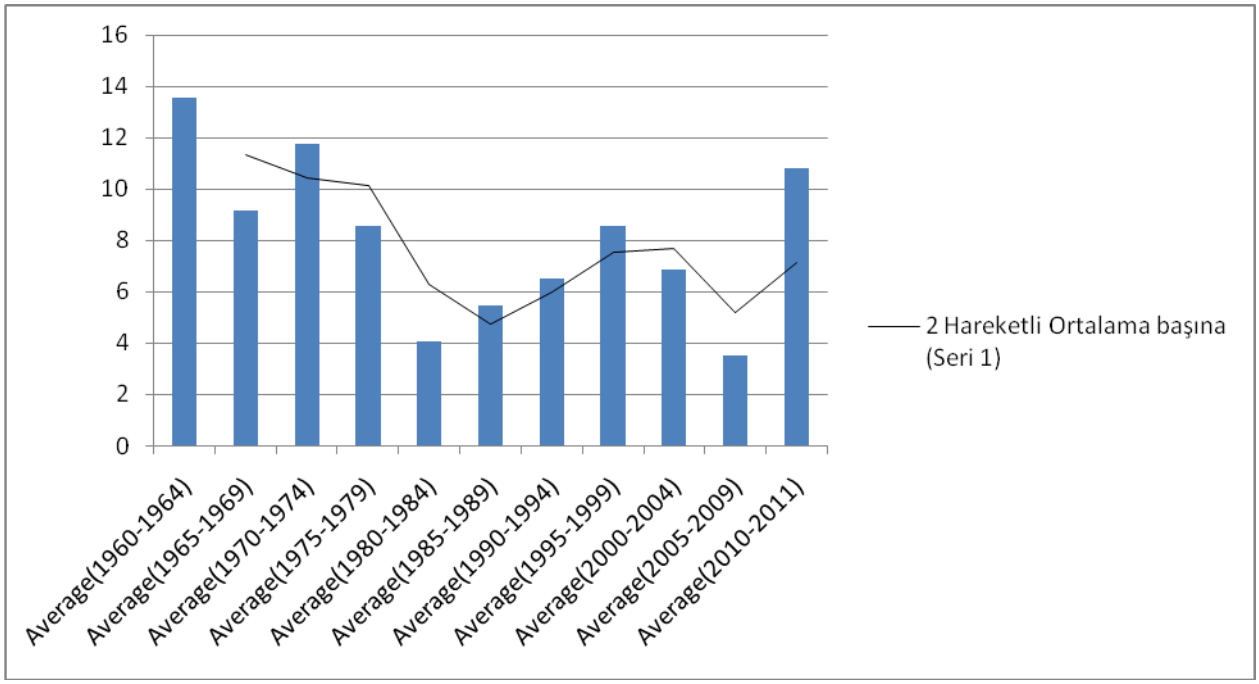
2.4.1 Trends in savings

Savings has become every nation's prority because of its strong correlation with economic growth. The Eastern Asia has seen some remarkable increase in their national savings due to the improvement of infrastructure and technology, whiles most countries in Latin America have experienced stagnancy (Apergis et al, 2012). In Africa, we have also received an undulating trend in our national savings (Loayza *et al.* 2000). Apergis and Christou (2012) defined the Gross Domestic Savings as calculated as GDP less final consumption (total consumption).

World Development Indicators (2013) also indicated an unstable movement in trend the Ghana's Gross Domestic Savings which supports the study of Loayza et al (2000). The bar graph below is an average of five years interval of Gross Domestic Savings as a percentage of GDP with data spanning from 1960 to 2012. The highest national savings was recorded between 1960-1965 and these were the early years after independence (Kpessa, 2010). The high savings was partially as a result of the small size in population of the country and the aboundance of natural resources. Politcian have also attributed that growth to good management of the resource by the then government of Ghana (Kpessa, 2010). The best savings period Ghana recorded was from 1960-1965. The undulating trend in Ghana's savings is as a result of economic and political instability. From the period of 1965 to 1969, the trend in savings began to falla nd this can be attributed to

the political unrest in the country after the overthrow of the First Republic. The fall in the trend of savings continued till it recorded one of its worse rate of about 4% in the from 1980 to 1984. The drastic drop of 4% was accounted for, as a result of as a result of political instablility and the heavy famine that resulted to low productivity from 1980 to 1984. However, in 1985, the Ghanaian economy started showing signs of economic recovery by increasing in savings to about 5.6%. This recovery continued and savings gradually increased to about 7.8% in the period of 2000 to 2004. A sharp fall was recorded during the period of 2005 to 2009 as a result of the global financial crises that hit the world at that time. However, with the recent discovery of oil, international financial institution have come to operate in the country like the Energy Bank and this has paid of as we see a tremendous recovery from the 4% to about 11% in 2010 -2011 savings. Figure 4 shows the trends in savings of Ghana.

Figure 4: Savings trends in Ghana



Source: World Bank Indicators (2013)

2.4 Chapter Summary

This chapter starts with a vivid history of our pension plans in Ghana, explaining the various reasons for the evolution of our pension systems. The study in this chapter, discusses the reasons why the pensions industry keeps growing. In that same section, it talks about the various actions that can be taken by an employer who is faced by the problem of ageing and ends by enforcing pension plan as the best option. Section 2.3 also talks extensively by the NPRA and its functions. SSNIT, responsible for administering the First- Tier pension scheme are also not left out with their functions fully elaborated. Other constitutionally licensed bodies like the Trustees, Fund Managers and Custodians were also brought to exposition with their functions fully stated. The pie chart diagram in this chapter graphically illustrates with percentage of contribution from the various economic sectors of the economy.

CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

Many countries have embarked on the journey of social security since ageing is inevitable in our societies and this backdates to the early nineteenth centuries. In our traditional circles, the extended families took care of the aged and sick people who could not work, however the situation we find ourselves currently is different due to the search for greener pastures. Pensions in diverse forms have one goal in every society and that is to smoothen consumption when one is old and cannot work anymore (Allen et al. 1966). Earlier literature have emphasised the need to cater for the aged in the society and this has been of prime importance to many governments across the globe.

Savings rate around the globe has been undulating and very volatile with East Asia saving more than 30% of the gross national domestic income (GNDI) whiles Sub-Sahara Africa saves less than 15% of their GNDI. Developed nations have similar determinants of savings whiles developing nations like Ghana, Nigeria and Korea also have their own savings characteristics (Deaton 1989; Gersovitz, 1988; Schmidt- Hebbel, 1992).

This chapter takes a critical review of the literature on pensions and savings developments. The review is divided into theoretical and empirical review. The former deals with the definitions and

conceptual issues of pension and savings. It is also concerned with models/ theories of pension, savings and savings determinants as well.

The second part has to do with the empirical considerations related to savings and pension where related works will be brought to play.

3.2 Theoretical literature

3.2.1 Definitional Issues

The insurance rationale for Public pensions arises because every individual is faced with quite a number of risks in his or her life time that typically cannot be insured in the private market (Aidt et al. 2008).

Pension systems are transfer schemes instituted by the State, with the purpose of providing income to the elderly in a context where informal arrangements are considered insufficient (Rofman & Oliveri, 2012). A pension is a contract for a fixed sum to be paid regularly to a person typically following retirement from service. The Organization for Economic Co-operation and Development (OECD) glossary (2005) defines Pension funds as a pool of assets forming an independent legal entity that are brought with the contributions to a pension plan for the exclusive purpose of financing pension plan benefit.

Pensions as explained by Agbobli (2010) is a means of investment for retirement purposes. It is considered as a long term investment vehicle which converts one's pension fund to pension income when an individual retires till he or she dies. The difference between pension and other investment is the availability of favorable tax treatment till the point of collection. This retirement benefit could either be provided by government or made private.

State pension combines social insurance and welfare scheme where the state or government improves the lives of the aged and invalid by smoothening their consumption when they have retired (Agbobli, 2010). Other names for state pension are public pension or social security schemes and these account for a substantial portion of disposable income of the aged (Aidt et al. 2008). Obeng (2008) explains social security as a scheme, established by statute for the protection of members through a series of public measures against economic and social distress. A comprehensive social security covers most productive workers (Perotti and Schwienbacher, 2006)

Non-state pension or private pension is a type of occupational scheme which is individualistic in nature. Here, the state is not involved in providing pension benefits, that is , government does not use state taxes to pay pensioners (Agbobli, 2010).

Adenutsi (2009) explains occupational pensions as a situation where an employer creates a pension scheme for its workers. Occupation pensions give advantage to both the employer and employee with respect to taxation.

The defined contribution is a type of pension scheme where the firm (employer) contributes into an established savings account for the employee as pension benefit when the employee retires. OECD (2005) explains defined contributions as an occupational pension under which the plan sponsor or firm pays fixed contributions and has no legal or constructive obligation to pay further contributions to an ongoing plan in the event of unfavorable plan experience

A defined benefit is a type of pension that promises a specified monthly benefit based on a formula that considers the contributor's salary and years of service (Department of Labour,

2013). A plan where benefits are linked through a formula to the members wages or salaries, length of employment, or other factor is defined by OECD (2005) as Defined benefit.

Though pensions schemes usually fall under defined contribution and defined benefit, they have changed with time due to diversity in social needs and constraints available making it either mandatory or contributory.

National savings is the total savings by the private sector and the government. Savings has been known to provide an important economic link between the past, present and the future of a country. With an adequate national savings rate, achieving targets like investment and growth can be realised (Aqdas and Bilquees, 1993) .

3.2.2 Models and theories related to pensions and saving

There have been extensive literature on pensions and savings but there is ambiguity on whether the relationship between pension and savings is positive or negative. However, some theories and models have been discussed in this section that implies the kind of relationship that is existed between the two economic variables.

The life-cycle model provides a framework to study mandatory pension scheme on savings at the micro-level. In this model, the individual lives for two periods, that is the working period and the retirement period. The insight coined from this model is the fact that it encourages consumption smoothening, that is, an individual will save during his working period and dissave for consumption purposes during retirement. The import of the model is that, when an individual is working, he will save in the form of pension income so that when he goes on retirement and he is not working any more, he will receive those savings as pension benefit to enable him continue

consumption like he used to when he was working. Analyzing this model at the microeconomic level, when the net pension wealth (present value of benefit minus value of contributions) is positive, an individual reduces all other forms of savings and this causes consumption to increase in both periods. If the net pension wealth is negative, an individual will prefer to increase their other forms of his savings and reduce consumption at each period. Now, if we introduce borrowing constraints, an individual may reduce his or her other savings (non-pension savings) because he knows there is a borrowing facility available. However, the overall aggregate savings will increase since the borrower will be paying plus interest on the loan (Murphy and Musalem, 2004).

Real world situation have some level of market imperfections and this generates a condition where pension income and wage income are not perfect substitutes. The theory assumes that the firms are risk neutral and employees are risk averse and an individual lives for four periods of equal length. The import from this theory is that workers always receive their highest post-training wage in their most senior working years at the firm and always end up with a pension less than their final wage (Arvin, 1991).

Money set aside for pension by individuals can be generated from three sources; money allotted to consumption, savings that would have been done in the absence of taxes, and savings as a result of higher disposable income. National savings will increase only in the first instance. The underpinning of this theory is that, from the Keynesian framework in a simple economy, savings equals Income minus consumption and considering a closed economy (Smith, 1991). A fall in consumption will cause savings to increase. In the second instance, the effect on savings is zero since pension contribution serves as taxes imposed on employers and employees. However, in

the case of higher disposable income, private savings is compensated by lower public savings causing a null effect on national savings (Attanasio and Deleire, 2002)

Pension portability and labour efficiency has been an interesting study since the 1990s. a training model which gives an implication that, for quitting a job with insurance benefit is equal to the value of the firm's investment has mostly been considered when finding the relationship between pension portability and labour efficiency. A significant observation made from the study is that, less tenure path appears less well suited to the shirking model than the training model (Dorsay, 1995).

Individuals also save for bequest motives. That is, people can save for their children, parents, relatives or friends in the form of inheritance. The besquest model suggests that every individual has a multi- generational time horizon, that is, a time as a child(dependant), and adult (independent) and a retired person(dependent). In the stages of dependence of a man's life, he may depend on bequest savings from beneficiaries. In this model, when we introduce the Pay as you go scheme of pensions, there is no dislocation of private savings since individuals will adjust their private bequest causing savings to offset the transfer. However when we introduce market imperfections to the model such as liquidity constraint, a displactment of Pension fund on national savings may occur (Kohl and O'Brien, 1998).

Humans sometimes do not act rational as assumed in most economic literature in the sense that, pension wealth might be considered as a separate asset class which is only used for retirement or invalidity purpose. When this happens, pension income will not be considered as part of

permanent income. If this situation occurs, there will be no substitution between pension and other savings. This in a long run will reflect as an increase in national savings since pension wealth will have its separate influence on savings whiles the individual continues to save for furthrt purposes (Bebczuk and Musalem, 2006).Pension is part of a worker's real wage. The author buttressed this point by establishing that the forgone increase in wage is the pension income contribution (Deroode, 1913).

Other authors have argued that, an important key in determining the effect of 401 (K) (U.S pensions) is heterogeneity in taste for savings. Poterba *et al.*(1995) hammers on the fact that based on household income and other demographic characteristics, the probability of one working at a firm which offers a 401 (k) plan is exogeneous and makes this independent of individual household saving behavior (Larra-lbara, 2011). This means that a smaller family size with high household income and fewer dependents may save more in pensions and other savings as compared to a large family size with many dependents and low household income.

When an individual saves voluntarily for the sake of retirement purposes, a rise in mandatory institutional saving, either through legislation or through collective agreement to broaden the scope of pensions will cause a large offset by a fall in voluntary savings. The offset of institutional savings for retirement purpose as a result of reduced savings in other forms depends also on the volume of liquid assets held by individuals [Samwick (1994); Caroll (1991); Deaton (1992)]

Reforms that have occurred in Chile (1981), Peru (1993) and Columbia (1994) have involved in the issuance of a special bond called "recognition bonds". This bond issued substitudes for the obligations of the Pay as you go system. In this way, recognition bond provides a mechanism for

government to partially reputable some of the implicit debt. If this occurs, current workers will respond by reducing consumption and increasing savings across board (Samwick ,1994).

The Pay as you go scheme is designed in a way that gives annuity to the contributor when he goes on retirement. The mandatory nature of most Pay as you go schemes in most developing nations helps government to overcome potential adverse selection. Reforms that have errupted in developing like Chile and Peru have created a non- annuity option for receiving benefit. When there is a decrease in accessing annuities occur, savings may have to increase to partially insure against longetivity risk (Samwick, 1994).

People save for precautionary motives. Individuals save in the face of uncertain deaths, income disruptions and extraordinary health expenditure. It is in this light a two period consumption model is used to explain a situation where an individual has in mind the distribution of his future (retirement) income but does not know what his pension income will be like. This can of model has uncertainty over both pension income and length of the individual's life. Labour income, interest rate and date of retirement is known while the utility function to used per- period is the Constant Absolute Risk Aversion (CERA). From this model, one is able to deduce that without certainty, consumption would be equal to the permanent income and with certainty, consumption equals permanent income minus precausionary saving due to lifetime and pension income uncertainty(Santen, 2013)

From the 2000 population and housing census conducted in Ghana, it was found out that about 80% of the working populace is in the informal sector of the economy (Mensah 2009). The import of this statement is that about 20% of the population in Ghana can be found in the bracket of formal working class in order to enjoy the SSNIT social security scheme.

As part of our Ghanaian culture, one family obligation for children is the care of aging parents. The author made this point to buttress the situation of pension not been indexed to inflation in Ghana. This implies that, a Ghanaian child in the working class group would have to save part of his income to cater for his or her aging parents. This will cause the other non-pension savings to reduce the overall aggregate savings to fall but pension contribution may not be affected since it is deduced from one's salary as a form of tax before it gets to the worker (Hendricks, 2000)

Kumado and Gockel (2003) extracted essential lessons from some various schemes around the globe like the Switzerland pension system, the Singaporean system and the Chilean system. The lesson from the First Pillar of the Swiss System which is in the form of pay as you go scheme provides a suitable environment for developing countries to strive since government steps in to contribute some percentage into the scheme. Ghana's New Three Tier Scheme has the first tier reflecting the lessons from the Swiss pension situation. The authors made a strong point of recommendation that the first tier of Ghana's new pension scheme should not operate under the fully funded scheme. This statement has an underpinning from the fact that majority of the Ghanaian populace is receiving wages below the minimum wage and government's heavy reliance on foreign donor source to finance budget. The second and third pillar of the Swiss pension is also reflected in the Chilean and Singaporean systems of pensions which provides both mandatory and voluntary schemes respectively. The third pillar which comprises of voluntary savings actually increases individual pension contributions which is offset by a reduction in other savings forms.

When a nation decides to move from a Pay as you go system to a fully funded system, this may not only cause welfare enhancement but also increase savings by merely changing the taste or technology for savings. This, the author explains as, in the Fully funded system, an individual

has a separate account for savings making it more transparent in terms of ownership. This confidence gained by individual household and stimulate and encourage the individual to save in other forms since he now knows how his pension fund is faring. Also, since these Fully funded schemes are privately managed, there is an improvement in access to capital markets. When these capital market are developed, this will cause savings to increase (Samwick, 1994 ; Schmidt- Hebbel, 1998). In Ghana's context, the pension reforms that led us to have the New Three Tier scheme, the second tier which operates as a Fully funded scheme and privately managed will increase capital market development and hence increase savings.

Whiles the subject of interest for this paper is essentially the relationship between national savings and pensions contribution, it is very essential to consider other determinant of savings which may impact directly or indirectly. Quite a number of studies have be done on the determinants of savings in both developing and developed countries, particularly notable ones are Deaton (1989), Gersovitz (1988), Schmidt-Hebbel, Webb and Corsetti (1992), Murphy and Musalem (2004) Bremang (2012), Adayi (2004), and Obeng (2008) and the savings determinants includes, old age dependency, young age dependency, urbanization, terms of trade, income and wealth, growth, real interest rate, inflation, financial deepening, and foreign savings.

3.3 Empirical literature

Empirical literature on social security and savings has produced a wide variety of conclusions. Lack of common concensus is due to the theoretical underpinnings and the lack of a clear empirical test.

The impact of aging population on economic growth depends on saving rate, capital stock, access to foreign capital and level of retirees. A series of dynamic panel estimators (within

group, first differentiated and system GMM) was used to achieve the objective of the extent to which old age dependency affect gross domestic product (GDP) growth. The study brings to light an interesting observation of a non-linear and negative relationship between savings and GDP growth in countries with high level old age dependency (Herzog 2012).

Considering the effect of health, wealth and wages on retirement behavior, a life-cycle model together with method of moments is used from a panel study with income dynamics. French (2005), examined this, and from his study,it was implied that if social security is removed from the compensation benefit, employees who are above sixty five years will want to stay a bit longer in the work place unless their strength gives them up

The extent to which pension benefit are offset by the reduction in wages has always been an interesting labour issue. Montgomery et al.(1990) tried to investigate this, through the Hedonic model. The U.S data for 1983 survey of consumer finance was used and the implication of the findings is that, a one to one pension-wage tradeoff is always established over a worker's life time.

A gap in pension and wages as a result of gender has been a study some economist have undertaken. A switching model as suggested by Maddela *et al*.(1985) with data from 1983 current population survey was used due to the inbuilt pension information. The understanding from finding was that, for each sex, pension coverage is associated with a 13% to 15% increase in return to observed characteristics (Even and Macpherson, 1990)

3.3.1Time Series Evidence

Diamons and Hausman (1980) used data from the Labour Department Survey of matured men and found results that were consistent to the life-cycle theory. The study identified a substantial substitution between individual asset accumulationand pension benefits provided through savings programs.

The life-cycle model suggested by Modigliani (1970) can be used to examine the net social security wealth on aggregate consumption. The author also considered the net effect of private pensions on private savings. In both studies, annual time series data spanning from 1929 to 1971 was used. Both sudies had a linear relationship and ordinary least squares was used for the estimations. The deductions from both studies are that social security indeed reduces personal savings by 30% to 15% and private savings does not affect private pensions (Feldstein, 1974; 1978)

The relationship between private pension coverage and savings has been examined by Munnel (1971) using a sample of men in their pre-retirement years over the period of 1966 to 1971. The summarised findings from this study is that pension plans discourages savings in other forms (Munnel, 1971)

Five thousand (5000) men between the ages of forty five (45) years and fifty nine (59) years in 1966 were used in the study of the effect of pension coverage on savings. The author controlled for age, income, education, race, desire to leave an inheritance, expected retirement age and life expectancy. The author's result suggest that both pension coverage and participation offset savings by reducing other forms of savings (Munnell, 1976). Another researcher (Kotlikoff,

1979) used the same data set provided by Munnel (1976) and discovered no significant effect of pension coverage on wealth or saving.

The study of pension and savings have taken various angles over the past thirty (30) years. Authors use several data that has pension characteristics. Older white men from a longitudinal retirement history survey was used by an author and interesting findings was realised. An insignificant effect of private pension wealth on other forms of wealth was discovered (Blinder *et al.* 1980). The spot light on Diamond and Hausman (1984) study was the indication that higher annual pension benefit induce ealier retirement. This means that when pension benefit is higher, working class who are characterised with saving may decide to retire before their retirement age, and this will reduce savings in the country.

Cross section of households were considered for the study of ratios that exist between private wealth and permanent income. In this study, permanent income is a function of age, income, social security wealth and other variables. The results indicated that non- pension wealth declines by between 27 and 51 cents per dollar of pension wealth and by between 17 and 21 cents per dollar of social security wealth (Dicks-Mireaux and Kings, 1984). Similar study considered using a cross section of American household and the estimates implied an offset of 16% of net worth to pension wealth and 33% to social wealth.

Ippolito (1986) also decided to consider the empirical evidence that is consistent with personal income tax theories of pensions. “Cross-section observations show a strong positive relationship between the probability of pension coverage and income level” (Ippolito, 1986). Considering the pension plan coverage for the private sector in 1979, it was observed that workers earning below $5000 per year in U.S.A exhibited a ten percent coverage rate. “The rate increases over higher

wage levels until it reaches seventy eight (78) percent coverage for workers earning more than $25,000 in 1979" (Ippolito, 1986)

The Vector Error Correction Model explained by Pesaran *et al* (2000) is a dynamic relationship model, that allows for the Long run and short run causality of variables. It is also efficient for small data sets of multivariate time series data (Pesaran and Smith 2006). Therefore, with a multivariate time series data with 31 observation, the model will be efficient in establishing dynamic relationships.

3.3.2 Cross country evidence

Cross sectional studies have discovered a complimentary relationship in terms of "recognition" and "goal feasibility" effect between Pension coverage and savings behavior. In the study under consideration, a positive relationship existed between pension coverage and private savings (Katona, 1965; Cagan, 1965).

The study of determinants of savings has been considered from both developed and developing country points of view. In one of the related works, the author used a panel of over 200 observations and one of the variables was social security. The import from the study is that, pension is a contributory factor of savings to all the thirty two (32) nations but decreases as other forms of savings increases. Also, a similar work with ten (10) countries and hundred (100) observations made a remarkable finding which meant that a country that practices the mandatory fully funded scheme will increase private savings(Edward (1996); Baillu and Reisen (1997)

The impact of age dependency on domestic savings has been empirically proven to be negative when sixteen African countries were considered using panel unit root, panel cointegration and panel causality tests and this supports the view that changes in non working population size are important when considering domestic savings rates in Africa (Apergis 2012).

A comprehensive analysis of pensions and wealth accumulation using Health and Retirement survey discovered some interesting findings. The indications from the results show a large effect of pension on wealth accumulation.

There are contradicting results from empirical literature on age dependency on savings. There are mixed empirical evidence across countries and methodologies (Apergis *et al*. 2012). In finding significant demographic effect, studies using cross country data has been found to be more successful than time series data for individual countires. Leff (1969), Modigliani (1970), Graham (1987), Edwards (1996), Muradoglu and Taskin (1996), Kelley and Schimdt (1996), Masson et al. (1998), and Loayza et al. (2000) found some evidence in favor of the life-cycle model. Studies undertaken at individual country level like Horioka (1997), Escobar and Cardenas (1998), Elbadawi and Mwega (2000), Thornton (2001), Prema-Chandra and Pnag-Long (2003), Serres and Pelgrin (2003) and Modigliani and Cao (2004) show that higher age dependency ratios are associated with lower saving rates.

Other studies like Goldberger (1973), Ram (1982), Husain (1995), Faruquee and Husain (1998), and Baharumshah et al. (2003) present cases in which the dependency ratio effect on savings may be insignificant or even positive.

Chapter Summary

There have been many write ups and papers on pension and savings across the globe. The chapter starts with the introduction of various papers and research works that have been reviewed in the context of pension and savings. Keywords regularly used in the study were defined and explained in the first section of theoretical literature. Also, the theoretical literature also considered several models and theories related to pensions and savings. Empirical findings that supported the various theoretical underpinnings was also reviewed and was divided into two parts; time series evidence and cross country evidence.

CHAPTER FOUR

THEORETICAL FRAMEWORKS AND METHODOLOGY

4.1 Introduction

The model specifications used in finding the effect of pensions contributions on national savings in Ghana during the period of 1980 to 2010 is explicitly expatiated and presented in this chapter. The study adopts the model used by Murphy and Musalem (2004).

The chapter also has a section for a theoretical framework. The overlapping generation model explains how the introduction of a Pay as you go scheme affects an individual's savings motive.

4.2 The Overlapping Generation Model

According to Murphy and Musalem (2004), the most natural analytical framework to study the effect of mandatory pension programmes on aggregate savings is the overlapping generation model with production due to Diamond (1965). Overlapping generations models have always proved useful in analyzing how transfers that occur between generation affect economic growth. The model was first presented by Samuelson (1958) and later Diamond (1965) introduced an overlapping generations model with a neoclassical production setting.

An economy is considered with two generations. Each generation lives for two periods, young and old. Each individual has no assets but receives labour incomes in both period. Individuals work in period one and retire at a fixed age in period two where they dissave from their savings (Magnussen, 1994). Individuals are said to be identical for all generations and are faced with a budget constraint.

The nature of the model is intertemporal and places emphasis on the role of aggregate savings and capital accumulation in determining long-term social outcomes. The model is intertemporal because it allows the interaction of two separate generations.

Assumptions

- Individuals live for two periods
- You live as young during period 1 and old person during period 2
- The number of individuals born in period t is Lt
- Population grows at a rate n such that $L_{t+1}=L_t(1+n)$
- Every individual is endowed with a unit of labor when young
- Every individual earns labor income
- One saves during period1 and dissaves during period 2.

The lifetime utility of an individual born at time t can be written as

$\mu(C^y_t, C^o_{t+1})= \mu(C^y_t) + \beta\mu(C^o_{t+1}),\ \beta>0$ …… (1)

where C^y_t is consumption when young

C^y_{t+1} is consumption when old

β is the discount factor and this reflects how impatient the consumer is.

The individual maximizes lifetime utility subject to the budget constraint. When the individual is young, his budget constraint is such that his savings and current consumption does not exceed the labour income(wage) net of pension taxes, that is;

$S_t+C^y_t =W_t -\tau$ ……..(2)

For an old folk, his budget constraint is such that the oldage consumption does not exceed the savings including interest earned and the public pension benefit (B), that is;

$C^{o}_{t+1} = (1+ r_{t+1})S_t + B$ …….(3) where r_{t+1} is the interest rate.

Combining the two constraints, we have;

From (b) we can see that $(C^{o}_{t+1})/ (1+ r_{t+1}) – B/(1+ r_{t+1}) = S_t$ …… (4)

Put equation (4) into (2), we get the result;

$(C^{o}_{t+1})/ (1+ r_{t+1}) – B/(1+ r_{t+1}) + C^{y}_{t} = W_t – \tau$

Which implies $C^{y}_{t} + (C^{o}_{t+1})/ (1+ r_{t+1}) = W_t – \tau + B/(1+ r_{t+1}) \equiv A$ …… (5)

Where A implies lifetime wealth of an individual born in the period t. it is important to note that this constrainst holds for both funded and the PAYG system of pensions. The behavior of the individual is affected by the W_t,, B, $1+ r_{t+1}$. Now, since we have the individual lifetime wealth, we maximize lifetime utility in equation (1) subject to the lifetime wealth in (5).

$L = \mu_t – \lambda(C^{y}_{t} + (C^{o}_{t+1})/ (1+ r_{t+1}) – A)$

$\delta L/\delta C^{y}_{t} = \mu'(C^{y}_{t}) – \lambda = 0$ ……(6)

$\delta L/\delta C^{o}_{t+1} = \beta \mu'(C^{y}_{t+1}) - \lambda/(1+ r_{t+1}) = 0$ ……(7)

$\delta L/\delta \lambda = - C^{y}_{t} - (C^{o}_{t+1})/ (1+ r_{t+1}) – A = 0$……(8)

from (6),

$\mu'(C^y_t) = \lambda$…….…… (9)

put (9) into (7), we get the result;

$\beta\ \mu'(C^y_{t+1}) = \mu'(C^y_t)/\ (1+ r_{t+1})$

$(1+ r_{t+1})\ \beta\ \mu'(C^y_{t+1})/\ \mu'(C^y_{t+1}) = \mu'(C^y_t)/\ \mu'(C^y_{t+1})$

$\beta\ (1+ r_{t+1}) = \mu'(C^y_t)/\ \mu'(C^y_{t+1})$ …….. (10)

From (2), one will save with one vision in mind and that is to smoothen consumption over the two periods of time. Now, if the individual decides not to save at all and there were no pensions benefits, we will have;

$S_t + C^y_t = W_t - \tau$, but savings =0, τ=0

$C^y_t = W_t$ when young

And when old, consumption will be zero since there will be no savings to consume from.

Now, assuming the individual decides to save GHS 1, he will forgo some consumption during his youth and this causes a small loss in utility. However, saving GHS 1 will increase consumption by $(1+ r_{t+1})$ in his old age. "This generates a lot of utility because the marginal utility of the first unit of consumption is very large and since this reallocation of resources is welfare improving, individuals will continue to save more" (Aidt et al, 2008). Now from the explanations surrounding (2), it can be clearly seen that savings is affected by variables like wages, interest rate, pension taxes, pension benefit.

Private savings for retirement becomes;

$S_t(W_t, r_{t+1}, \tau, \beta) = W_t - \tau - C_t^y$ …… (11)

which means savings is a function of wages, interest rates, and pension contribution

Since wages and interest rates are considered as fixed, savings can be affected through net taxes (contributions) and β (pension benefits). That is, when τ increases, there will be a fall in private savings. Also, when β increases, there will be a fall in private savings. The overall effect, allowing wages and the interest rate to change depends on how the system is funded.

4.3 Model Specification

Arising from the theoretical frameworks of the study and considering the studies by Larbi (2013), Bremang (2012) and Loayza *et al*. (2000), the model for the study is specified as;

$$\mathbf{Nsr = \alpha_0 + \alpha_1 per_t + \alpha_2 odr_t + \alpha_3 ydr_t + \alpha_4 gdpgrowth_t + \alpha_5 r_t + \alpha_6 infl_t + \alpha_7 fd_t + \varepsilon_t}$$

Where per = pension contribution

odr = old age dependency ratio

ydr = young dependency ratio

gdpgrowth = growth of GDP

r = interest rate

infl = inflation

fd = financial deepening

nsr = national savings rate

ε = error term.

4.4 Definition and expected signs of variables

This section of chapter four, defines and explains all the various variables used in the study and predicts the expected sign according to theories and empirical works.

4.4.1 National savings

Loayza *et al*. (2000) used national savings as the dependent variable and regressed it against all the other forms of savings.

National savings rate is obtained using adjusted saving which is the net national savings as a percentage of the gross national Income (GNI) and this calculated by the World Bank. Net national savings are equal to gross national savings less the value of consumption of fixed capital. This type of adjusted savings is prefered to the adjusted saving (current us dollar) since it gives ratios rather than actual figures as captured by the World Bank data. The expected sign for comparing pension contribution and savings is ambiguous since it depends on several factors like whether the pension scheme is mandatory or voluntary and whether the scheme is Fully funded or a Pay as you go scheme.

4.4.2 Pension

Murphy and Musalem (2004) finds a relationship between national savings and pensions depending on the type of scheme under study. Feldstein (1974; 1978) also considered the effect of social security on consumption and found out that, social security reduces personal savings.

Pensions savings ratio is the ratio of pensions contributions in Ghana as a percentage of GNI. Pension contributions is the annual pool of savings by working group in the SSNIT pension scheme since 1980 to 2010. . The gross national income as explained by World Bank is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income . GNI serves as the best denominator since all resident producers are required by the Ghanaian law to cover all their employees under a pensions scheme. Data for the pensions variable is gotten from the annual report of SSNIT. A positive sign is expected between pension and savings since mandatory schemes are only considered in the study.

4.4.3 Old age dependency ratio

World bank defines old age dependency ratio is the ratio of older dependent (people older than 64 years) to the working age population (people within the ages of 15-64 year). The old age dependency data used for this analysis is the proportion of dependents per 100 working age population.

Adiah (2004) affirms the position that indeed in the life cycle model, retired individuals will have negative savings since they do not receive labour income. Bremang (2012) report that the breakdown of the extended family system in the Sub-sahara Africa, where the aged is catered for by the members of the family has caused individuals to save whiles they are young inorder to dissave to smoothen consumption when they are old. This means that a negative sign is expected according to Bremang (2012). Microeconomic and macroeconomic evidence, both international and at single-country level, all confirm that a rise in oldage dependency ratios tends to lower private savings- a result in line and accordance with the pridictions of the life-cycle theory

(Schmidt-Hebbel, 1992). We will expect a negative cofficient when we regress this against national savings.

4.4.4 Young Dependency Ratio

Young dependency ratio as defined by Worldbank, is the ratio of young dependents(people younger than 15) to the working age population (people within the ages of 15-64years). Also, just like the oldage dependency data, the young dependency data used for this analysis is the proportion of dependents per 100 working age population.

According to Leff N (1969), children represent a heavy charge to expenditure which in national accout, enters under the heading of consumption.

Schmidt-Hebbel, (1992) in a panel evidence, indicated that, a rise in a young-age dependency ratio leads to a decline in private savings rate. So, just as the oldage dependency ratio, we also expect a negative coefficient when regressed with national savings.

4.4.5 Growth of Income

World Bank defines growth of gross domesic product as annual percentage growth of GDP at market prices based onstant local currency. This measures the growth of income in an economy. A complete annual growth data set of GDP is available from the World Bank with data spanning from 1980 to 2013. This variable is justifiable in the regression because country based research involving Ghana like Adiah (2004) considered it as a determinant of savings and have a positive relationship with savings.

In an economy of stagnancy, what the active labour saves is what the dependents dissave for consumption smoothening. In other words, a growing economy has active people more than compensating dissaving passive people (Murphy & Musalem, 2004).

A simple permanent-income theory predicts that higher growth, that is in future income reduces current savings. However, considering the life-cycle model , growth has an ambiguous effect on savings (Norman et al, 2000).

4.4.6 Real interest rate

Real interest rate is the rate of interest an investor is expected to receive after allowing for inflation. However, the World Bank defines this as the lending interest rate adjusted for inflation as measured by the GDP deflator. This is the real interest rate and is calculated manually by the researcher as deposit rate minus inflation.

Explaining this, an increase in real interest rate will make present consumption more expensive and this will induce individuals to save more. On the other hand, an increase in the real interest rate makes it possible for the transformation of a given amount of present consumption into more units of future consumption and this will induce savings to fall (Murphy and Musalem, 2004). A positive real interest rate motivates individuals to save more of their disposable income (Bremang, 2012).

The effect of interest rate on savings can not be predicted because, income and substitution effect of higher interest rates, work in the opposite direction (Schmidt-Hebbel, 1992). A high interest rate will reduce the prevent value of the future income inflows in an economy. Basing one's argument on a non econometric country studies, Mckinnon (1973) and Shaw (1973) argued that rate of return on savings, as measured by real interest rate will have a positive effect on savings rate. Fry (1978, 1980) and Balassa (1990) held this view by backing them with empiral works though Fry alluded to the fact that the magnitute of the effect was small.

4.4.7 Inflation

Generally, inflation could be explained as the general rise price levels of goods and services in an economy over a period. However, the World Bank defines it as measured by the annual growth rate of the GDP implicit deflator, shows the rate of price changes in an economy as a whole. The inflation data for this study covers from 1980 to 2010. The data used in this study is the inflation of annual consumer prices recorded by world development indicators.

Inflation has the tendency of affecting savings directly and through interest rates. When we have high inflation in an economy, stagnation or recession may occur in that economy causing economic instability and uncertainty. Murphy and Musalem,(2004) stablished in their study, that inflation has an ambiguous effect on savings. Therefore, the expected sign for inflation is ambiguous when establishing a relationship with savings

4.4.8 Financial deepening

This is the variable that captures and measures vehicles available in a country for save. When we have better functioning financial markets, this may foster savings to grow. The ratio of money to gross domestic product is traditionally taken as a proxy for finanacial deepening in most studies (Adiah, 2004). Adiah (2004) further goes on to explain that when this proxy is used as an explanatory variable for financial deeping, a positive coefficient is always recorded. Edward (1996) also finds that the coefficient is always positive. Therefore a positive sign is expected between financial deepening and savings

4.5 Estimation Techniques

The Ordinary Least Squares (OLS) was emphasized as the main estimation technique for the study. The OLS was preferred in the study because of simplicity and also because the variables were time continuous variables. The choice of OLS is appropriate because it minimizes the sum of squared vertical distance between the observed responses in time series data Koutsoyiannis (1973). Also, the study considers OLS because of its wide use when analyzing the relationship between pension and savings by various economist working on time series data on a particular country.

Verbeek (2004) reports that, one of the cornerstones of econometrics is the linear regression and the OLS estimation method. A simple linear regression can be written as ;

$$Y = \beta_0 + \beta_1 x_1 + \ldots\ldots + \beta_k x_k \quad (1)$$

Where β_0 ,.. β_k are th constants to be determined. Lets assume that observations are indexed by *i* such that *i* = 1,….. N. the difference between an observed value Y_i and its linear approximation is given as;

$$Y_i - [\beta_0 + \beta_1 x_1 + \ldots\ldots + \beta_k x_k] \quad (2)$$

Gathering all the β coefficients in equation (1), can be summarized as $\beta_i = [\beta_0, \beta_1, \ldots \beta_k]'$ and $x_i = [x_1, \ldots x_k]'$ in a K-diamentional factor and can be rewritten as ;

$$Y_i - x_i' \beta \quad (3)$$

Clearly, one would like to minimize the values of the β_i and can do that by summing the sum of squared difference. This can be written as ;

$$S(\beta) = \sum(Y_i - x_i' \beta)^2 \text{ , from } i = 1, \ldots. N. \qquad (4)$$

This approach is referred to as Ordinary Least Square estimation. To solve the minimization problem, one can look at the first order condition obtained by differenting S (β) with respect to β (Verbeek, 2004). This results in ;

$$2\, x_i(\sum(Y_i - x_i' \beta) = 0 \ , i = 1,\ldots., N \qquad (5)$$

Equation (5) is sometimes refered to as a normal equation.

Lets assume b as the solution to the minimization problem and can be written as;

$$b = \left(\sum x_i x_i'\right)^{-1} \sum x_i y_i \quad \text{where } i = 1, \ldots., N \qquad (6)$$

when the second order condition is fulfilled, we have b to be minimized. The resulting linear combination of x_i is thus given as ;

$\mathbf{y_i = x_i' b}$ which is the best linear approximation of Y from x_1 ,….. x_k and a constant.

Estimating the VECM

The VECM is neatly documented in Garratt *et al*,(2006) and will be briefly explained in this study. A weakly exogenous variable as explained by Hendry and Richard,(1983) is uncorrelated with the stochastic error tem. For the VECM to be applicable there must be cointegration among variables (Johansen, 1992). A precondition, indicating that variables are assumed to be non stationary at level but become stationary after the first differenceis first established. This means they are integrated at at same order before they become stationary.

Because stationarity of variables is an essential characteristic for VECM, the mean and variance of the variables must be constant over time. A series that has stationarity at first difference can be written as I(1). The Augumented Dickey Fuller test and the Philips Peron tset can be used to test for stationary (Dickey, 1979).

The Johansen and Juselius approach is used to check for cointegration after the variables are station at first difference. The Trace test and the Mazimum eigen value test can be both appropriate for cointegration. The null hypothesisis or r cointegrating relations as against the alternative of r +1 cointegrating relations for r = 0,1,2,.....n- 1. This test can be written as;

$$LR_{max}\ (r / n +1) = T * \log(1 - \lambda) \qquad (1)$$

λ= maximum eigen value

T= sample size

With the same hypothesis, the equation for the Trace Statistic test can be written mathematically as ; $LR_{tr}\ (r/n) = - T * \sum^{n}_{i=r+1} \log(1 - \lambda)$ (2)

Now if it established that there is cointegration in the model, the VECM is applied in order to know the long and short run properties of the cointegrated series. It is however important to note that if the model lacks a cointegration property, then the VAR model is used. The regression equation of the VECM is of the form

$$\Delta Y_t = \alpha\varepsilon_{t-1} + \gamma\Delta X_t + u_t \qquad (3)$$

Where u_t (error term) is independent and identically distributed and the first difference of the dependent variable Y_t can be explained by the lagged ε_{t-1} and ΔX_t . ε_{t-1} is the one period lagged value from the estimation of the equilibrium error term.

4.6 Justification for using OLS and Vector Error Correction Model (VECM)

The choice of this estimate (OLS) is justifiable for establishing a linear relationship between pension funds and national savings from the theoretical framework of the study. However, due to the multivariate nature of the secondary data time series, the VECM as proposed by Johansen(1988) is appropriate since it is an extension of the univariate autoregressive model to suite multivariate time series. The VECM also estimates the speed at which the dependent variable settles back to equilibrium after a change in the independent variables.

4.7 Data types and source

Two types of data are used in this study namely; primary data and secondary data. The primary data was collected from pensioners to fulfill the objective three of the study whiles the secondary data was used to establish the relationship of pensions and other forms of savings and trends in savings and pensions.

Data was collected for the period, 1980 to 2010 due to the availability of data at that period. The data for study is partly obtained from the World Development Indicators,World Bank and Social Security and National Insurance Trust (SSNIT) reports. National savings rate is proxed as the adjusted savings, which is the net national savings as a percentage of gross national income. The gross national income as explained by World Bank is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income. Data on national savings rate and GNI is provided by the World Development Indicators.

Data on inflation, and GDP growth was extracted from the World Development Indicators. Real interest rate was calculated by the researcher as lending rate minus inflation (Bremang, 2012). The lending rate data was extracted from the Institute of Social and Statistical Economic Research (ISSER) annual report on the "State of the Ghanaian economy".

4.8 Primary Data Section

This section of the chapter carefully considers the issues associated with primary data. The section starts with describing the research design, qualitative and quantitative data technique, the population and sample size and a complete description of the structure of the questionnaire administered

4.8.1 The Research Design

Using Field survey as the research design, qualitative and quantitative data would be employed. The instrument for the primary data collection was a questionnaire. A well structured questionnaire was administered to respondents belonging to the National Pensioners Association in the Greater Accra caption area. The questionnaire was administered in a form of face to face interview. The structure of the questionnaire was in the form of open ended and closed ended. The closed ended questions captured the membership profile of the respondents whiles the open ended questions in the questionnaire gave respondents the opportunity to express their views on the challenges faced by pensioners on the scheme. Information that were not numerically measured are qualitatively taken in this study and quatitative data was used to analysis numerical measurements.

4.8.3 Sampling Frame

The study covers the pensioners in Greater Accra who are members of the National Pensioners Association in Ghana. There are about one thousand registered pensioners in the Greater Accra branch of the National Pensioners Association.

The entire sample is taken from the Greater Accra registered members of the National Pensioners Association in Ghana. A total of one hundred and twenty respondents were used in the study and the number is as a result of the scientific estimation formula $[(Z^2 P(1-P))/E^2]$. This formula as illustrated by Israel (1992) was explained as ;

Z representing the normal distribution table value at 5% significance level

P representing the estimate of proportion of pensioners falling into the group of interest. For same size purposes, P is usually 0.5

E representing the margin of error(confidence interval)

Three meeting points were selected based on the number of turnouts of members for meeting and the time of meeting. The study gathered the data for three days at the National Pensioners Association- Dansoman branch, Labadi branch and the Osu branch. Out of one hundred and fifty questionnaire administered, one hundred and twenty were received and validated for use for the analysis. According to SSNIT report (2010), Greater Accra has the highest number of pensioners and this makes the choice of the region more appropriate since it can represent diversification because of the number. The thirty questionnaires that were not used in the survey analysis was as a result of questionnaires not returned after filling. The questionnaire were administered in

accordance with the membership list at the branches, sixty five questionnaires at Dansoman, forty five at Labadi and forty at Osu.

4.8.4 Questionnaire Design Format

The questionnaire designed for this study took the standard format of clarity and simplicity. The topic of the study was boldly and clearly indicated to give the respondent an idea of the work. Also, issues of confidentiality of response were assured in the form of writing. For puposes of coding, every questionnaire had a specific reference number.

The questionnaire is divided into two sections, that is the personal profile section and the membership profile section. The former consist of close ended questions that gives some particular information about the respondent like age range , gender, level of education, and religious status.

The membership profile also consist of questions in open ended forms and closed ended forms. The open ended form provides grounds for respondent to highlight views on a question.

For the purpose of simplicity, the questions were asked in basic English language. The questionnaire administered consisted of twenty questions.

CHAPTER FIVE

PRESENTATION AND DISCUSSION OF RESULTS

5.0 Introduction

This chapter starts with the discussion and analysis of the questionnaire administered. Pie chart, bar charts, and doughnut charts are used in the graphical representations of the findings in the study. Also, percentages are used in the measurement of the results in the primary data.

The estimation technique to be used to estimate the Overlapping generations model in this research is the ordinary least squares(OLS) and the Cointegration approah. These approach requires that a model fulfills the assumption of linearity, normality, homoscedasity and no autocorrelation in order to be best fit. The model in equation (3) depicts linearity among variables and this is justified by savings literature of their relationships.

5.1 Discussion of results from survey

This section captures the views of pensioners on the Social Security and National Insurance Trust (SSNIT) scheme and fill the objective of identifying the challenges in the scheme.

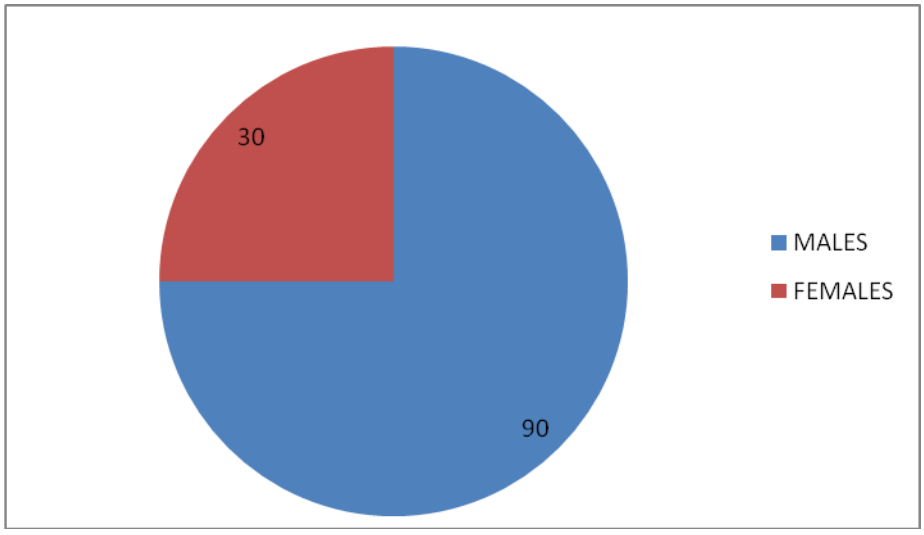
5.1.1 Socioeconomic Features Of Respondents

The Field survey conducted, interviewed a total of one hundred and twenty respondents who are members of the National Pensioners Association in Greater Accra.

Out of the total number interviewed, ninety of them were males and thirty were females representing 75% and 25% respectively. SSNIT report (2010) accounts that there are about 80% of male pensioners and 20% female pensioners as recorded in 2010. Therefore the survey

representation gives a fair gender representation. The gender disparity could be as a result of low level of education among females in the early times of independence since SSNIT scheme largely covered the formal working sector of the economy. The gender status of respondents is shown in figure 5

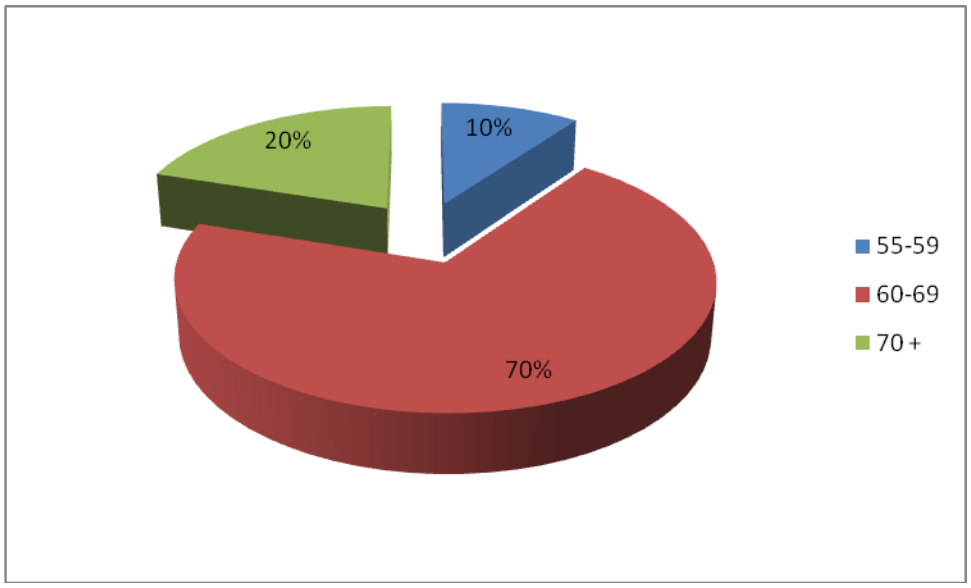
Figure 5: Gender of respondents



Source: Field survey (2013)

The age distribution of the sample was such that 10% within the ages of 55 to 59 whiles 70% of the respondents were within the ages from 60 to 69. The remaining 20% were for respondents who were 70 and above. The modal age range was 60 to 69 years. The 10% recorded for respondents within the ages of 55 to 59 was the least in terms of percentages and this may be because voluntary retirement in Ghana is not so attractive considering that one will not receive full pension benefit. Also, this may be because of dependents who are catered for at that age. Pensioners who are over 70 years were the second least age group in the sample probably due to general weakness that are associated with that age. This is clearly shown in figure 6.

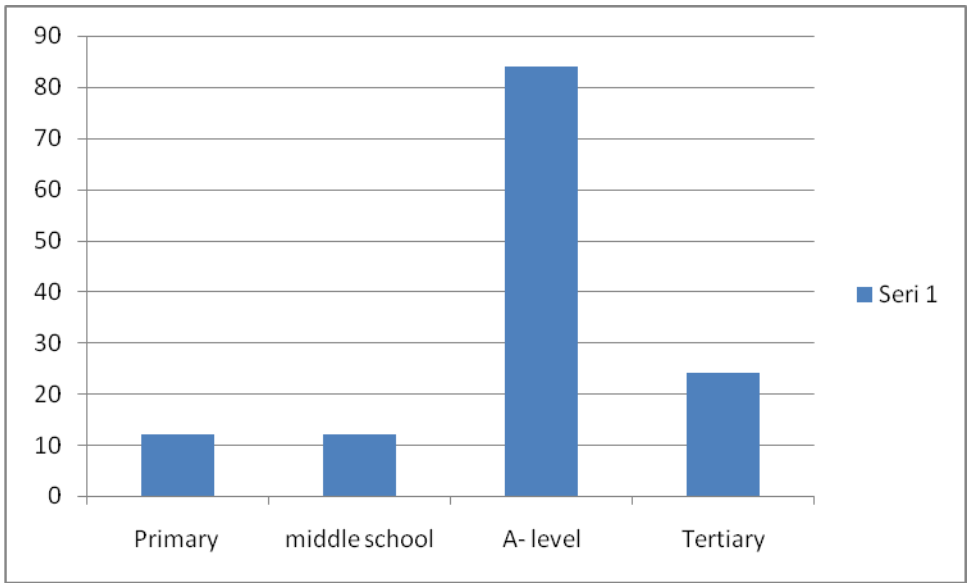
Figure 6: Age statistics of respondents



Source: Field survey (2013)

Respondents were asked their highest level of education attained before they retired. It was revealed from this field survey that A-level graduates had the highest frequency, followed by tertiary graduates. Primary and middle school leavers recorded the least in the frequency. This level of education before retirement will also help in determining ones salary range during the working years of the individual. Figure 7 shows the educational status of respondents

Figure 7: Educational status of respondents

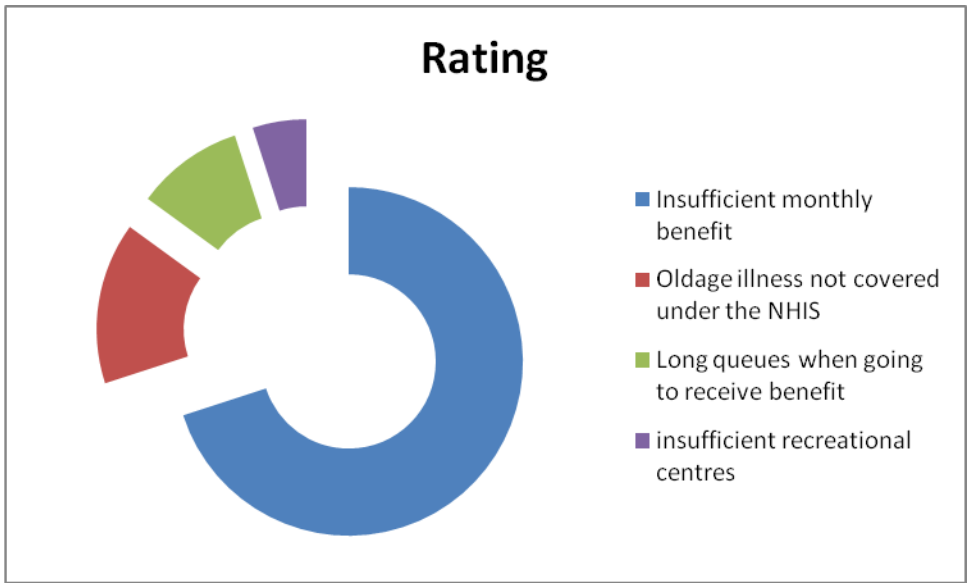


Source: Field survey (2013)

A qualitative information about the challenges faced by pensioners of the scheme was sought. From this, the challenges were grouped and measured. The most prevailing challenge from the field survey was insufficient monthly benefit. This was very well expected due to the educational level of respondents before retirement. Pensioners who usually retired with primary, secondary and post secondary level of education usually retired with lower benefit due to the low level in their salaries as compared with respondent with tertiary level of education. Also respondents gave further reasons like the benefits were insufficient because they still had dependents to cater for. Also, illness associated with old age was the second most predominant challenge face by pensioners. The SSNIT scheme registers every pensioner of the scheme under the National Health Insurance Scheme (NHIS) and this scheme does not cover illness that are faced with the aged in the community. This intend reduces their benefit when illness occur. The challenge of long queues and insufficient recreation centres were third and fourth respectively in terms of

their frequency from the field survey. Figure 8 displays the challenges faced by pensioners under the SSNIT scheme

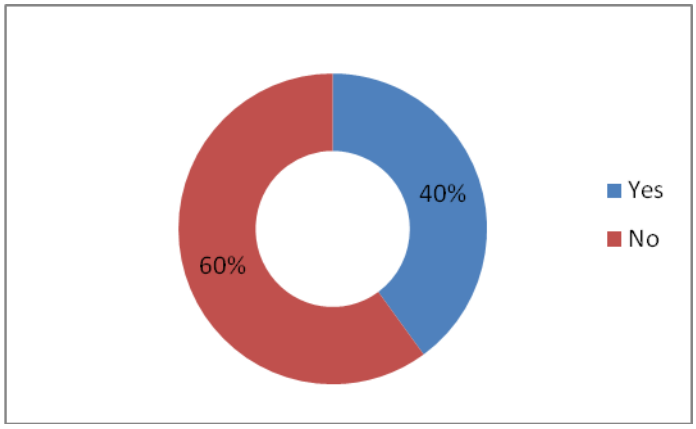
Figure 8: Challenges faced by pensioners



Source: Field Survey (2013)

Because all SSNIT contributors make monthly payments to NHIS levy, pensioners were interviewed on level of satisfaction derived from their long contribution to the NHIS scheme. From the survey, 60% of respondents were not happy with the NHIS scheme whiles 40% were happy with the scheme. The level of dislike is probably illnesses associated with old age that are not covered. Seventy out of the one hundred and twenty respondents were not happy with the services they received from the Health Insurance. Figure 9 displays the quality of healthcare pensioners get from the NHIS scheme

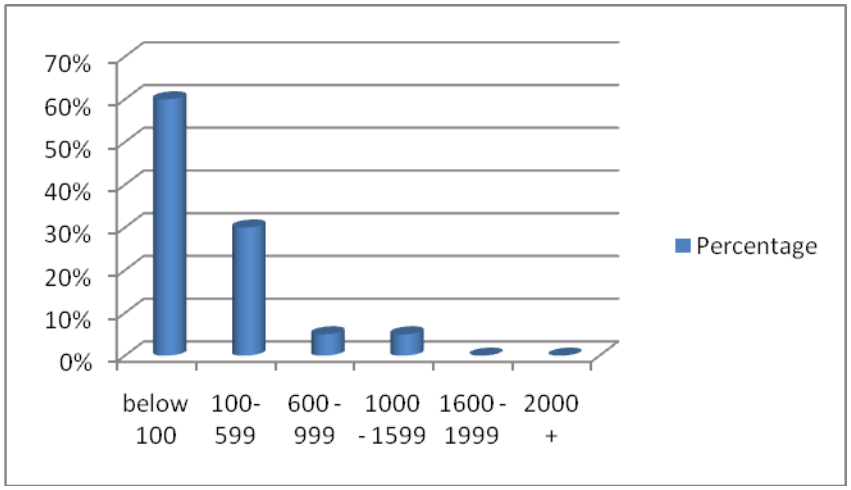
Figure 9: Whether Pensioners Get Quality Health Care Under NHIS Scheme?



Source: Field Survey (2013)

Respondents were also interviewed on the range of benefits currently received. From the survey, it was discovered that, 60% of the respondents received below GH S 100, and 30 % received between the range of GH S 100 to GHS 599. 5% for respondents in the benefit range GH S 600 to GH S 999. The survey recorded 5% for pensioners receiving between GH S 1000 to GH S 1599. Both GH S 1600 to 1999 and GH S 2000 + recorded 0%. This clearly shows and confirms that majority of our respondent who ended with A-level certificate may receive around GH S 100 and the Tertiary graduate receive around GH S 500 as pension benefit. Figure 10 displays the analysis graphically.

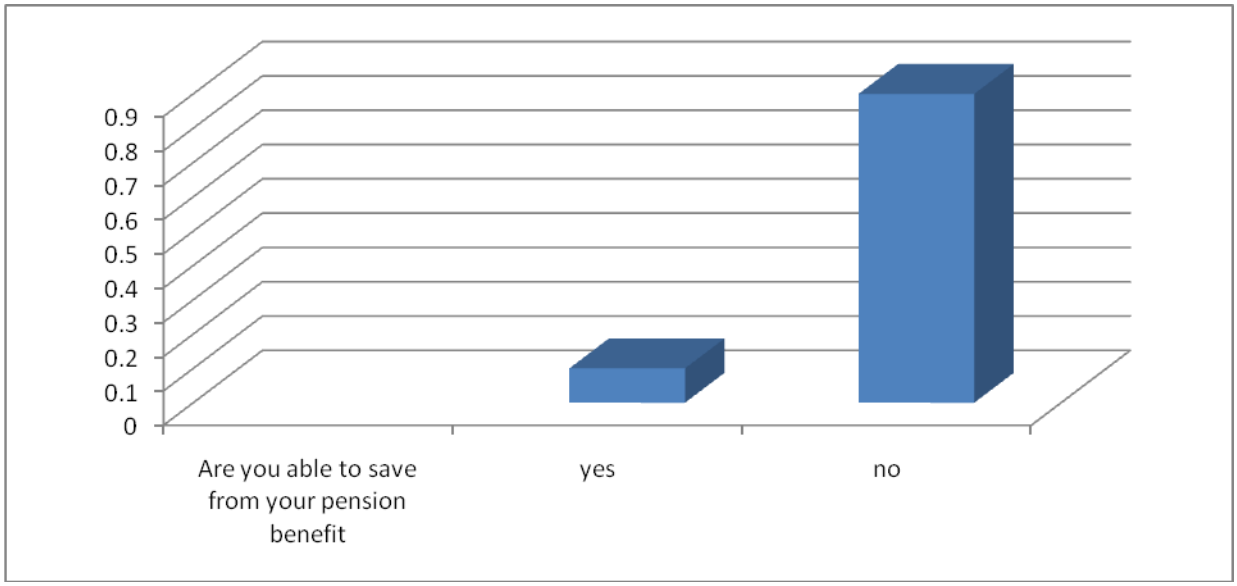
Figure 10: Pension benefit received



Source: Field survey (2013)

After the view of benefit range was sought, a question was asked if respondents were able to save during retirement. One hundered and eight respondent out of the one hundred twenty responded that they were not able to save with their pensions, and this forms about 90% of the sample size. This response however confirms the complain of insufficiency of the benefit. However, the 10% who responded that they are able to keep some portion of the pension income, indicated that they save below GH S 50. Figure 11 illustrates the ability to save by respondents

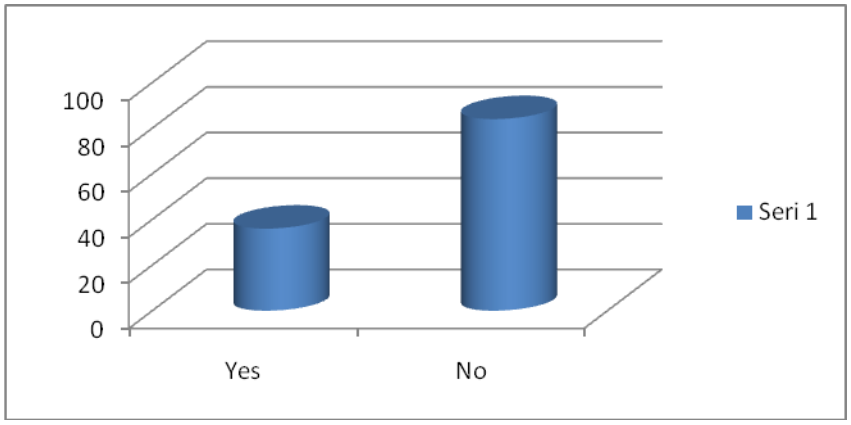
Figure 11: Ability to save the pension benenfit



Field survey (2013)

Respondents were asked whether they were happy with the SSNIT scheme they are currently enjoying. Out of one hundred and twenty respondents, 60% said they were not happy with the SSNIT scheme, whiles 40% responded that they were happy with the scheme. This could be probably be reflecting the challenges respondents were facing with the scheme. Figure 12 displays the analysis of the level of satisfaction of the scheme

Figure 12: Level of satisfaction with the scheme



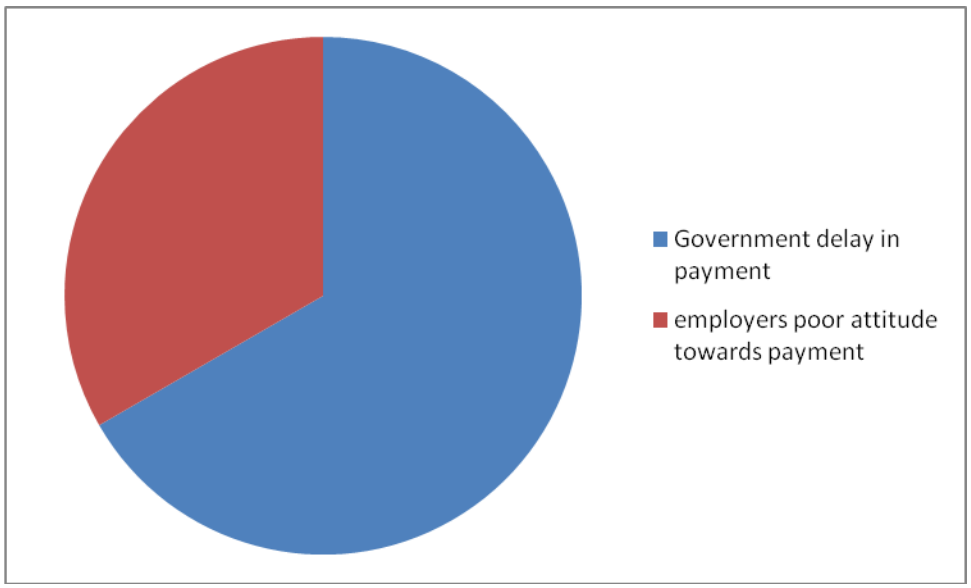
Field survey (2013)

5.2.2 Administrator's view

Another interview was also conducted to expose the challenges faced by SSNIT from the perspective of the administrators. The study interviewed departmental heads from SSNIT and a number of interesting findings were brought up during this interview and these are discussed below:

Out of the five Heads of departments, three were interviewed on the basics of availability at the time of the study. Two of the three respondents iterised the point that the untimely payment of the pension scheme by Government slows down the progress of the scheme and also slows down benefit payment since this is a Pay as you go scheme. This was also captured in chapter two of the study and confirms the study's findings. A pie chart below illustrates this graphically.

Figure 13: Challenges faced by administrators



Source : Field survey (2013)

5.3 Vector Error Correction Model

5.3.1 Unit Root and Stationarity Test

The Johansen approriate was used for Cointegration test in this study. The Johansen model has a precondition that states that; variables are assumed not to be stationary at levels but when converted to first difference, then they become stationary, that is integrated of the same order.

The Augmented Dickey Fuller (ADF) test was used to test for stationary of all variables at level and at first differencing. After first differencing, the dependent variable (national savings rate) and other independent variables like pension contribution, growth of GDP, and financial deepening was stationary. Other variables like interest rate, young age dependency ratio, oldage dependency ratio and inflation were dropped because they were not stationary after first differencing.

The autocorrelation and partial autocorrelation correlogram graph was also used to confirm this test with the null hypothesis being non stationary and alternate hypothesis, stationary.

Table 4; ADF Test for Stationarity

ADF Test for Stationarity			
Variable	**Test statistic**	**P- value**	**Result**
Nsr	**-6.559**	**0.000***	**I(1)**
Fd	**-7.891**	**0.000***	**I(1)**
GDP growth	**-6.305**	**0.000***	**I(1)**
Per	**-7.072**	**0.000***	**I(1)**

Number of observations = 29
Dickey Fuller Test, Lag (0)
*significance at 1%
Source: **Authors analysis from OLS using STATA 12**

Test Result using ADF

5.3.2 Selecting The Number of Lags

To efficiently use a Vector Error correction Model (VECM), it is prudent to know the most appropriate lag order for the model. From the multivariate time series data, VECM prestimation diagnostic test for lag selection was applied. With this, the study considered the results of five lag selection criteria. This include Likelihood Ratio (LR) test, Final Prediction Error (FPE) test, Akaike's Information Criterion (AIC) test, Hannan-Quinn Information Criterion (HQIC) test, and Schwarz' Bayesian Information Criterion. The result of the study showed that all the five lag selection criteria chose Lag order 5 as the best lag in all system models for the study. That is, Lag 5 had the least value in all the Lag estimation techniques.

Table 5; LR, FPE, HQIC and SBIC Tests for optimum Lag

LR, FPE, AIC, HQIC and SBIC test result for Optimum lag length						
Lag Length	**0**	**1**	**2**	**3**	**4**	**5**
LR	**-**	**46.603**	**37.296**	**30.649**	**67.532**	**79.675***
FPE	**224.256**	**130.366**	**117.515**	**162.985**	**78.0799**	**54.6124***
AIC	**16.7641**	**16.2025**	**15.9988**	**16.0507**	**14.6841**	**12.8505***
HQIC	**16.8911**	**18.4811**	**16.5004**	**16.7753**	**15.6316**	**14.0209***
SBIC	**16.9577**	**17.1702**	**17.7404**	**18.5669**	**17.9745**	**16.9151***

*indicating best choice at lag 5
Source: **Authors analysis using STATA 12**
Test Result using various optimum lag length test

5.3.3 Johansen Cointegration Test

Having verified that all the variables are stationary at first difference, the next approach was to perform the cointegration test. Because of our multivariate time series nature of the secondary data, it was appropriate to use the multivariate cointegration technique proposed by Johansen (1988), and Johansen and Juselius (1990) to determine whether there are stable long-run relations.

The study used the trace statistic and the max statistic value to find out if there was a cointegrating equation in the model. The Johansen trace statistic result indicated an asterixed 29.2330 value at rank 1 which was less than the 5% critical value of 29.68. This means that, there was one cointegration equation in the model.

Also, result from the Johansen Maximum eigen statistics indicated that, at rank 1, the maximum value is 16.6211 which is less than the 5% critical value of 20.97. This also confirmed that, there

was one cointegration equation in the model. This makes the model appropriate for the VECM test.

5.3.4 Vector Error Correction Model (VECM) for Dynamic Adjustment

As a result of one cointegration equation in the model, it could be said that pension contribution, national savings, financial deepening and GDP growth are cointegrated in the long run.

With the given multivariate time series data, VECM makes use of the first difference of variables in the model. Since the study was interested in the model with national savings as the dependent variable, the displaced results of VECM in the appendix only captured that.

The Error Correction Term (ECT) or the speed of adjustment with the differenced national savings rate (D_nsr) was -0.3638378 and was very significant with p value less than α (0.05). If the ECT is negative and significant, then, we can say there is a long run causality running from pension contribution, growth of GDP, financial deepening to National savings.

A post estimation test of the linear hypothesis was undertaken to know the short run causality of the model. With the result indicating a P value less than α (0.05), the null hypothesis of no short run causality was rejected. This means that pension contribution, growth of GDP and financial deepening all had a short run causality effect on national savings rate.

The ECM of -0.36 implies that when the average national savings rate is too high, the model quickly adjust by falling to the levels of the average ratios of pension contribution, financial deepening and growth of GDP.

From the displaced VECM result in the appendix, it was shown that at 5% significance level, there was a significant negative relationship between national saving and financial deepening in Ghana. At first and second differenced lags of financial deepening, a percentage unit increase in financial deepening will result in a 0. 49 and 0.54 decrease in the differenced national savings rate. Loayza *et al.* (2000) report that, theory suggest an ambiguous sign of this variable. This result contradicts with some studies like Murphy and Musalem (2004) who found a positive relationship between financial deepening and national savings and confirms the findings of Loayza *et al.* (2000). One of the largest investors is SSNIT in Ghana and the type of scheme they run will affect financial deeping since most of their investments are long term. The negative relationship of financial deepening supports the evidence found by (Oya and Oamar, 2006).

Also at 5% significance level, a percentage unit increase in GDP growth, will cause a decrease of 0.47 in a differenced national savings rate. This means that there is a negative relationship between pensions and national savings in Ghana**.** This result, supports the permanent income theory which predicts that, higher growth in future reduces savings (Norman et al, 2000).

Pension contributions , which happens to be the main explanatory variable also was positively correlated to national savings at 10% significance levels. This means that a percentage unit increase in Pensions contribution cause a corresponding increase in national savings in Ghana. The positive relationship between pensions and national savings conforms to literature as suggested by Murphy and Musalem (2004).

This model was significant with R-squared been equal to 0.97. The implication of this figure is that the variables included in the model explains 97% of the variation in the dependent variable (national savings) understudy.

Table 6; VECM Results

Vector Error Correction Model Results

	D(nsr)	D(fd)	D(growth)	D(Per)	ECF	constant
LD	**0.038**	**-0.489****	**0.087**	**-45.028***	**-0.364***	**3.704***
	(0.194)	**(0.016)**	**(0.221)**	**(17.366)**	**(0.041)**	**(0.819)**
	0.845	**0.040**	**0.694**	**0.010**	**0.000**	**0.000**
L2D	**0.706***	**-0.540****	**-0.361**	**46.266****		
	(0.183)	**(0.026)**	**(0.265)**	**(24.426)**		
	0.000	**0.040**	**0.174**	**0.053**		
L3D	**1.756***	**0.031**	**0.393**	**38.991****		
	(0.332)	**(0.231)**	**(0.244)**	**(17.350)**		
	0.007	**0.185**	**0.107**	**0.025**		
L4D	**1.033***	**0.008**	**- 0.466****	**39.712**		
	(0.381)	**(0.238)**	**(0.234)**	**(21.816)**		
	0.007	**0.736**	**0.046**	**0.069**		

Souce; **Authors analysis using STATA 12**
,*,** signifies 1%,5%,10% significant levels respectively
Note: The upper, middle, and lower figures estimated coefficient, standard error, and P-value, respectively.

5.3.5 Shortrun causality Test

A simple post estimation test of linearity of the hypothesis on all the variables was used to identify if there existed a short run causality of pension contribution, financial deepening, and GDP growth to national savings. With a significant P value, the null hypthosis of no shortrun causality was rejected. This means that, all the independent variable had a causes a change in national savings.

5.3.6 Test for Residual Autocorrelation

The study used the Lagrange multiplier Test to test for residual autocorrelation. From the table below, it can be concluded that at lag order 5, we accept the null hypothesis of no autocorrelation in the model

Table 7; LM Test for Autocorrelation

LM Test for Autocorrelation			
Lag	**chi^2**	**df**	**p> chi^2**
1	**33.7237**	**16**	**0.00592**
2	**13.4364**	**16**	**0.64062**
3	**28.5992**	**16**	**0.02678**
4	**27.0616**	**16**	**0.04080**
5	**15.2335**	**16**	**0.50760***

H_0; no autocorrelation at Lag order.
*indicating no autocorrelation at lag 5
Source: **Authors analysis from OLS using STATA 12**
Test Result using LM Test

5.3.7 Residual Normality Test

A post estimation Jarque – Bera test was conducted on the residuals on all the VECM to check for the normal distribution of residual, which is preferred . from the table below, all the VECM models were normally distributed in the residuals. The model of interest with national savings as the dependent variables was normally distributed

Table 8; Jarque- Bera Normal Distribution Test

Jarque – Bera Normal Distribution test			
Equation	**chi^2**	**df**	**P> chi^2**
D_nsr	**1.098**	**2**	**0.57749***
D_fd	**0.326**	**2**	**0.84969**
D_growth	**0.007**	**2**	**0.99638**
D_per	**0.029**	**2**	**0.98556**
ALL	**1.460**	**8**	**0.99335**

All means the individual equations were joined
*indicating the equation of interest
Source; **Authors analysis from OLS using STATA 12**
Test Result using LM Test

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter provides the total summary and conclusion for this study, as well as recommendations for policy analysis and further studies. We conclude this chapter with the limitations of the study.

6.2 Summary and conclusion of the study

Population statistics in Ghana show a continuous steady increase in age dependency and a sharp decline in fertility rate posing a problem of worry since a decrease in the number of working class might affect the SSNIT pension scheme. This study, considered two important economic variables and their in Ghana, Pensions and Savings. With this, the trends, challenges and prospects were considered using both qualitative and quantitative methods.

The research was based on three objectives namely; to examine the trends in pension contributions and national savings in Ghana, to establish the relationship between pension contributions and national savings, to identify the prospects and challenges in the pension industry.

Pensions in Ghana have evolved been loyalty rewarding in the 1940s to the current mandatory and voluntary scheme called the New Three Tier scheme. The thrust of the problem statement is why Ghana's savings is low, though we have been practicing mandatory pension programme for over thirty years. There have been divergent views about the relationship between pension and

national savings in literature. The significance of the study is to outdoor the reality in Ghana's context.

The pensions industry started with Cap 30 which was a loyalty rewarding scheme and then moved to provident fund in 1965 providing lump sum payment to beneficiaries. After the Provident fund, the government introduced the mandatory Pay as you go social security scheme which was in the form of annuity payment. Currently, Ghana is operating under the New Three Tier Scheme which is a combination of both mandatory and voluntary contribution and a combination of both annuity and lump sum payment.

The literature review commenced with the definition of keywords in the study as the first phase of theoretical literature section. Theories and models related to pensions and savings like life-cycle theory, bequest model with the introduction of the Pay as you go, heterogenirty in taste for savings and pension reforms from Chile, Peru and Columbia. Also, authors like Mensah (2009), Kumado and Gockel (2003) and Kpessa (2010) narrows the scope of literature to Ghana's context. The empirical literature section explores several works in relation to the study in terms of time series, cross section and panel data analysis.

The section for theoretical frameworks and methodology clearly explains the two Overlapping generation frameworks behind this study and the stepwise approach in achieving the objectives of the study. Overlapping generation model served as the theoretical frameworks of the study, from which a linear regression was coined up and a cointegration model helped to establish the true relationship of pension contribution and national savings due to the multivariate nature of the time series. The reason for framework in the study is that, the Overlapping generation model explains pension and savings at the micro level. The Ordinary Least Squares was used to estimate the linear relationship of variables, whiles the Vector Error Correction Model was used

to establish whether there is a positive or negative correlation between pension and savings due to the multivariate nature of the time series secondary data. A questionnaire was distributed to 120 respondents who are pensioners registered in the National Pensioners Association(NPA), Accra branch. The objective was to identify the challenges pensioners go through with the social security scheme. Three out of five departmental heads from SSNIT, were given questionnaires to fill to identify the challenges from the administrators points of view and an expert pension researcher was interviewed to indentify the research challenges in the pension industry. The definition and justification of the variables included in the regression were clearly explained and supported with literature. The model specification was brought forth as a result of the combination of the Overlapping generations model and. the studies by Larbi (2013), Bremang (2012) and Loayza *et al*. (2000)

Results from the VECM model indicates that, financial deepening and GDP growth were found to be significant at 95% confidence intervals and they were both negatively correlated to national savings in Ghana. This negative correlation supports the results of Herzog (2012). The results from the VECM model also showed a long and short run causality relationships. The Langrange Multiplier Test also indicated that there was no residual autocorrelation in the model. The Jarque- Bera test indicated a normal distribution in all the VECM equations.

In the nutshell, it can be concluded from this study that, pension payments does contribute to national savings in Ghana. This stands to prove the stands of Murphy and Musalem (2004), that mandatory pensions contribution indeed causes national savings to increase. The findings that, pension contribution increases national savings in Ghana means that better policy reforms that aims at increasing mandatory pension contributions and ensuring an enjoyable pension life should be encouraged .

6.3 Recommendations for Policy implementation and further studies

Arising from the findings in the study, the following are recommendations for policy are suggested;

- Government should stop delaying payment of contribution since they are the major employer in the economy so that benefit payment is not delayed in the Pay as you go scheme.
- Policies such as free treatment of age related diseases for pensioners should be put in place so that pensioners under the SSNIT scheme will be able to treat most of the illnesses associated with old age.
- Policies that will attract more informal workers to contribute can gear towards increasing the coverage of pensions should be put in place so as to help increase national savings.

This work paves the way for further advanced study in pensions, separately considering the schemes and its relationship with other economic variables. Further studies can also consider both the private and the public pension to know the overall effect of pensions on national savings.

6.4 Limitations of the study

The study faced challenges that has caused gaps in this research. The issue of data availability was predominant. SSNIT was not able to provide me with separate data for Pay as you go contributions and the provident fund scheme.

There was also difficulty in identifying pensioners since the National Pensioners Association could not provide me with a concise list and contacts of pensioners.

The work should have covered all other forms of pensions, including the private pensions but failed to because of lack of concise data and information.

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APPENDIX 1

QUESTIONNAIRE

PENSION CONTRIBUTION AND NATIONAL SAVINGS IN GHANA;TRENDS, CHALLENGES AND PROSPECTS. Ref ☐

The researcher is a final year MPhil Economics student from the University of Ghana and working on the above topic. Any information given is for academic use only. Your responses will be kept confidential.

Please tick where appropriate.

SECTION A (**Respondent's personal profile**)

1. Age ☐ up to 55years to 60 years
   ☐ 61years to 70 years
   ☐ 71 years and above
2. Gender ☐ Male ☐ Female
3. Occupation before going on pensions
   ☐ Formal ☐ informal
4. Qualification (level of education) before going on pensions
   ☐ Primary ☐ J.H.S
   ☐ S.H.S ☐ Tertiary
5. Religio
   Christianity ☐ Islam ☐ Tradition ☐

SECTION B (Membership Profile)

6. Are you under any pension scheme? ☐ Yes, please specify……..

☐ No

7. Have you joined the SSNIT Pensions Scheme ?

☐ Yes ☐ No

8. If you are a SSNIT Pensioner, are you enjoying the scheme?

☐ Yes ☐ No

9. If no, please your reason

……
……
……

10. Do you get quality health care with your NHIS card in the health centers?

☐ Yes ☐ No

11. Do you get all your drugs that have been covered under the NHIS?

☐ Yes ☐ No

12. What do you think about the attention you get at the hospital with the NHIS card?

☐ Very good ☐ Good

☐ Bad ☐ Worse

13. What is the range of your pension benefit?

(i) ☐ GHS 100 to GHS 500

(ii) ☐ GHS600 TO GHS 1000

(iii) ☐ GHS 5000 to GHS 10000

(iv)

(v) ☐ GHS 10,000 to GHS 50,000

14. Do you go through administrative challenges when you are going for your benefit?

☐ Yes ☐ No

15. If yes, please explain

……
……
……
……
……
……
……

16. Are you able to save from your pension monthly benefit?

☐ Yes ☐ No

17. If yes, what is the range of your personal sa[illegible]s after retirement?

(i) ☐ Below GHS 10

(ii) ☐ GHS 11 to GHS 50

(iii) ☐ GHS 60 to GHS 100

(iv) ☐ GHS 100 to GHS 1000

18. Are you privately employed?

☐ Yes ☐ No

19. What do you think can be done to improve the SSNIT pensions scheme?

……
……
……
……
……
……
……

20. How would you describe the scheme?

☐ Very good ☐ Good

☐ Bad ☐ Worse

THANKYOU FOR YOUR COOPERATION!!!!!

APPENDIX 2

QUESTIONNAIRE FOR ADMINISTRATORS

"PENSION CONTRIBUTIONS AND NATIONAL SAVINGS IN GHANA: TRENDS, CHALLENGES AND PROSPECTS". Ref ☐

The researcher is a final year Mphil Economics student of the University of Ghana working on the above topic. Any information given is for academic use only. Your responses will be kept confidential.

Please tick where appropriate.

SECTION A

1. Please tick the department you belong
   - ☐ ACTUARY
   - ☐ AUDIT
   - ☐ PUBLIC AFFAIRS
   - ☐ STRATEGIC PLAN IMPLEMENTATION
   - ☐ RESEARCH

2. Gender ☐ Male ☐ Female

3. Please indicate years of service with SSNIT ; ……..

SECTION B

4. Please list the challenges faced by the SSNIT pension scheme

THANKYOU FOR YOUR COOPERATION!!!!!

APPENDIX 3

```
                delta:  1 year

. varsoc nsr fd growth per, maxlag(5)
```

Selection-order criteria
Sample: 1985 - 2010 Number of obs = 26

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-213.934				224.252	16.7641	16.8199	16.9577
1	-190.632	46.603	16	0.000	130.366	16.2025	16.4811	17.1702
2	-171.984	37.296	16	0.002	117.515	15.9988	16.5004	17.7407
3	-156.659	30.649	16	0.015	162.985	16.0507	16.7753	18.5669
4	-122.893	67.532	16	0.000	78.0799	14.6841	15.6316	17.9745
5	-83.0561	79.675*	16	0.000	54.6124*	12.8505*	14.0209*	16.9151*

Endogenous: nsr fd growth per
Exogenous: _cons

```
. corrgram D.nsr
```

LAG	AC	PAC	Q	Prob>Q	[Autocorrelation]	[Partial Autocor]
1	-0.2284	-0.2286	1.7275	0.1887		
2	0.0251	-0.0504	1.7491	0.4170		
3	-0.1962	-0.3322	3.1183	0.3737		
4	-0.1755	-0.4964	4.2561	0.3725		
5	0.0000	-0.3429	4.2561	0.5132		
6	-0.0621	-0.4660	4.4105	0.6213		
7	0.0922	-0.3312	4.7655	0.6886		
8	-0.0183	-0.3993	4.7802	0.7808		
9	0.2326	0.0438	7.2535	0.6107		
10	-0.1371	-0.2105	8.1553	0.6137		
11	0.1686	1.0988	9.5924	0.5674		
12	-0.2528	-0.2688	12.999	0.3691		
13	-0.0375	0.4259	13.079	0.4417		

```
. corrgram D.fd
```

LAG	AC	PAC	Q	Prob>Q	[Autocorrelation]	[Partial Autocor]
1	-0.3951	-0.3952	5.1665	0.0230		
2	-0.0365	-0.5356	5.2121	0.0738		
3	-0.0203	-0.2837	5.2268	0.1559		
4	-0.0956	-0.5315	5.5639	0.2342		
5	0.0739	-0.1814	5.7739	0.3288		
6	-0.0143	-0.1054	5.782	0.4480		
7	-0.0044	-0.0901	5.7828	0.5653		
8	-0.0439	-0.4693	5.8669	0.6621		
9	0.1405	0.5365	6.7688	0.6612		
10	-0.1316	-0.2178	7.6007	0.6678		
11	0.1735	1.1658	9.1212	0.6107		
12	-0.1493	0.2639	10.31	0.5888		
13	-0.0029	1.5386	10.31	0.6684		

```
. corrgram D.growth
```

LAG	AC	PAC	Q	Prob>Q	[Autocorrelation]	[Partial Autocor]
1	-0.1759	-0.1837	1.0243	0.3115		
2	-0.1857	-0.2530	2.207	0.3317		
3	-0.1957	-0.3566	3.5694	0.3119		
4	0.0973	0.0013	3.9192	0.4171		
5	0.0195	0.0628	3.9338	0.5590		
6	-0.1366	-0.1597	4.6806	0.5854		
7	0.1037	-0.0610	5.1295	0.6442		
8	-0.0367	0.0160	5.1884	0.7373		
9	0.0600	-0.0626	5.3528	0.8025		
10	-0.0830	-0.1063	5.6838	0.8411		
11	0.0094	-0.1022	5.6883	0.8933		
12	0.0511	0.0922	5.8274	0.9245		
13	-0.0209	-0.1071	5.852	0.9514		

```
. corrgram D.per
```

LAG	AC	PAC	Q	Prob>Q	[Autocorrelation]	[Partial Autocor]
1	-0.2808	-0.2818	2.6105	0.1062		
2	-0.0813	-0.2982	2.8372	0.2420		
3	-0.1258	-0.3534	3.3995	0.3340		
4	-0.0480	-0.3475	3.4846	0.4802		
5	0.1089	-0.0811	3.9396	0.5581		
6	-0.0634	-0.2257	4.1003	0.6631		
7	0.0065	-0.2117	4.102	0.7680		
8	-0.0800	-0.3585	4.3812	0.8212		
9	0.1129	-0.1252	4.9642	0.8374		
10	-0.0117	-0.2030	4.9708	0.8931		
11	0.1837	0.3571	6.6765	0.8246		
12	-0.1673	-0.1127	8.1686	0.7718		
13	-0.1011	-0.1952	8.7455	0.7919		

Johansen tests for cointegration

Trend: constant Number of obs = 26

Sample: 1985 - 2010 Lags = 5

maximum rank	parms	LL	eigenvalue	trace statistic	5% critical value
0	68	-134.35936	.	102.6065	47.21
1	75	-97.672602	0.94052	29.2330*	29.68
2	80	-89.362055	0.47232	12.6119	15.41
3	83	-83.263261	0.37446	0.4143	3.76
4	84	-83.056091	0.01581		

maximum rank	parms	LL	eigenvalue	max statistic	5% critical value
0	68	-134.35936	.	73.3735	27.07
1	75	-97.672602	0.94052	16.6211	20.97
2	80	-89.362055	0.47232	12.1976	14.07
3	83	-83.263261	0.37446	0.4143	3.76
4	84	-83.056091	0.01581		

```
. vec nsr fd growth per, trend(constant) lags(5)

Vector error-correction model

Sample:  1985 - 2010                              No. of obs      =         26
                                                  AIC             =   13.28251
Log likelihood =  -97.6726                        HQIC            =   14.32756
Det(Sigma_ml)  =  .0215317                        SBIC            =   16.91163

Equation           Parms      RMSE     R-sq      chi2     P>chi2
------------------------------------------------------------------
D_nsr                 18   1.74406   0.9702   260.889   0.0000
D_fd                  18   73.4179   0.8972   69.80921  0.0000
D_growth              18   .978273   0.8890   64.0781   0.0000
D_per                 18   .035414   0.9326   110.7283  0.0000
------------------------------------------------------------------

------------------------------------------------------------------------------
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
D_nsr        |
        _ce1 |
         L1. |  -.3638378   .0414503    -8.78   0.000    -.4450788   -.2825968
             |
         nsr |
          LD. |   .0378301   .1938079     0.20   0.845    -.3420265    .4176866
         L2D. |   .7062159   .1830521     3.86   0.000     .3474404    1.064991
         L3D. |   1.755607   .3324037     5.28   0.000     1.104108    2.407106
         L4D. |   1.033411   .3805757     2.72   0.007     .2874965    1.779326
             |
          fd |
          LD. |  -.0488786   .0157071    -3.11   0.002    -.0796639   -.0180933
         L2D. |  -.0539704   .0263056    -2.05   0.040    -.1055283   -.0024124
         L3D. |   .0305919   .0230687     1.33   0.185    -.0146219    .0758058
         L4D. |   .0079997   .0237641     0.34   0.736    -.0385769    .0545764
             |
      growth |
          LD. |   .0868059    .220515     0.39   0.694    -.3453957    .5190074
         L2D. |  -.3602474   .2651734    -1.36   0.174    -.8799778     .159483
         L3D. |   .3930859   .2435871     1.61   0.107    -.084336     .8705078
         L4D. |  -.4663785   .2340369    -1.99   0.046    -.9250825   -.0076746
             |
          per |
          LD. |  -45.02778   17.36645    -2.59   0.010     -79.0654   -10.99016
         L2D. |   46.26601   24.42552     1.89   0.058    -1.607126    94.13914
         L3D. |   38.99084   17.35011     2.25   0.025     4.985257    72.99642
         L4D. |    39.7122   21.81577     1.82   0.069    -3.045912    82.47032
             |
        _cons |   3.704496   .8193046     4.52   0.000     2.098689    5.310304
------------------------------------------------------------------------------
```

```
. test ([D_nsr])

 ( 1)  [D_nsr]L._ce1 = 0
 ( 2)  [D_nsr]LD.nsr = 0
 ( 3)  [D_nsr]L2D.nsr = 0
 ( 4)  [D_nsr]L3D.nsr = 0
 ( 5)  [D_nsr]L4D.nsr = 0
 ( 6)  [D_nsr]LD.fd = 0
 ( 7)  [D_nsr]L2D.fd = 0
 ( 8)  [D_nsr]L3D.fd = 0
 ( 9)  [D_nsr]L4D.fd = 0
 (10)  [D_nsr]LD.growth = 0
 (11)  [D_nsr]L2D.growth = 0
 (12)  [D_nsr]L3D.growth = 0
 (13)  [D_nsr]L4D.growth = 0
 (14)  [D_nsr]LD.per = 0
 (15)  [D_nsr]L2D.per = 0
 (16)  [D_nsr]L3D.per = 0
 (17)  [D_nsr]L4D.per = 0

           chi2( 17) =  258.67
         Prob > chi2 =    0.0000
```

```
. veclmar, mlag(5)

  Lagrange-multiplier test
```

lag	chi2	df	Prob > chi2
1	33.7237	16	0.00592
2	13.4364	16	0.64062
3	28.5992	16	0.02678
4	27.0616	16	0.04080
5	15.2335	16	0.50760

```
  H0: no autocorrelation at lag order
```

```
. vecnorm, jbera
```

Jarque-Bera test

Equation	chi2	df	Prob > chi2
D_nsr	1.098	2	0.57749
D_fd	0.326	2	0.84969
D_growth	0.007	2	0.99638
D_per	0.029	2	0.98556
ALL	1.460	8	0.99335