Chapter 1

1.1 Introduction

An understanding of the rationale for providing retirement schemes, their principal functions and different methods of financing them is crucial to structuring and implementing sustainable retirement schemes in sub-Saharan African (SSA) countries. The fact is that the structure of economies in this part of the world is very different from that in the developed world, in that an official social net barely exists. In the developed world most countries have some or other a form of provision for retirement for the elderly. They are provided through systems like Pay-As-You-Go (PAYG) or other forms, such as pension and provident funds, social grants, etc.

The PAYG system has been under increasing scrutiny due to its strain on the public budget especially in view of changes in the demographic structure in developed countries. These changes have created a gap between contributions from the PAYG system and the benefits necessary to pay for the retiring generation. This gap increases the government deficit and subsequent debt to finance the necessary expenditure. The continuous rise in government debt to pay benefits to retirees has caused the sustainability of PAYG systems in the developed world to be questioned. As a result many alternative or complementary methods to this system were proposed. However, they all involve shifting costs, that is, the cost of moving away from the PAYG system to alternative systems or to establishing a new system that complements the PAYG system.

A shift away from the PAYG system to possible alternatives requires careful evaluation of the cost-benefits this will entail. One view is that individuals may become more responsible about their old age provision and another is that individuals remain myopic and cannot foresee what will happen to them if they do not save for retirement. While the first view is valid for economies where individuals may have rational expectations, the second seems to be the more likely approach. There are two possible reasons for the latter behaviour, namely:

(i) Individuals are simply myopic and they disregard the importance of saving for retirement and (ii) Low income prevents individuals from behaving rationally, they simply cannot save.

The second reason seems to be applicable to most sub-Saharan African economies. The disposable income of the majority of people living in these countries does not enable them to save for old age. Many have to survive on less than one US dollar per day. This suggests that a mandatory PAYG system may be appropriate for these countries, which requires small contributions from individuals supported by contributions from employers.

Changes in the structure of the population do not affect sub-Saharan Africa as it does developed countries. Low per capita income however, prevents the PAYG system to raise sufficient revenue to pay for the required benefits to retirees. The debt governments need to incur to finance retirement benefits may have "back warding" effects on their economies, similar to the effects that changes in the demographic structure have on developed countries.

Government debt emanating from borrowing to finance retirement programs with a concomitant increase in interest rates, constrain the formation of productive capital. High interest rates and lower investment in the productive sector reduce the level of equilibrium output. If the population continues to grow at a steady state rate, then the government will be forced to either raise taxes or debt to finance retirement benefits, thereby further constraining the budget. Moreover, it is argued that contributions to retirement funds reduce savings due to both income and substitution effects during the life cycle of the individual. These effects severely impact the relevant countries (mainly developing ones) with serious financial resource constraints. In these countries retirement funds should be treated as the most important asset of an individual, since his/her capacity to save for retirement is very low. In order to implement appropriate retirement systems in sub-Saharan African economies, the difficulties of balancing their budgets and considering the effects of retirement programs on the economy, need to be carefully analysed. Through the application of econometric panel data techniques, this study attempts to reveal the specific effects of retirement programs on the growth of a selected number of economies in SSA.

The selection criteria are determined by the availability of data and only countries with at least 10 years of data available on benefit payments were selected.

This study contains eight chapters. The first chapter presents an introduction, defines social security in the context of this study, explains the problem statement, objectives, significance and the limitations of the study and defines the hypothesis to be tested. The second chapter discusses the available social security programs in sub-Saharan Africa, including qualifying conditions for benefit payments and a regulatory framework. It also presents the different savings alternatives to a retirement system. The third chapter provides a literature review of the impact of retirement schemes on issues like saving, economic growth and fertility. The fourth chapter discusses the theoretical framework, including the effect on the economy of different methods of financing retirement systems. Chapter 5 presents the model specifications and discusses the advantages of using panel data as econometric tool, as well as the source of the data used in the study. Chapter 6 presents the results of the study as well as the results of bootstrapping and finally, Chapter 7 draws some policy implications, based on the research results, with some recommendations.

1.2 Defining Social Security

The principal objective of social security programs is to provide individuals with income that allows them to meet their basic needs, like food, housing, health care, etc. at a time when income is insufficient. It can also provide benefits in kind, in addition to monetary benefits, in the form of food stamps, child grants, etc. This definition is in line with the European Union definition of social protection expenditure which states that: Social security protection…"*encompasses all interventions from public or private bodies intended to relieve households and individuals of the burden of a defined set of risks and needs, provided that there is neither a simultaneous reciprocal nor an individual agreement involved*" (ESSPROS, 1996:12)[1]. This is a broader definition of social security

[1] ESSPROS means European System of Integrated Social Protection Statistics)

coverage, which can be sub-divided into many other narrower definitions depending on the focus of the study or government program.

In this research social security takes the narrower definition by only considering the provision of income for the aged, in other words retirement benefits. Thus, hereafter, social security means retirement benefits. Such benefits result from contributions (compulsory or mandatory) of individuals during their lifetime earnings. These are generally levied as a tax on a worker's wages in a pay-as-you-go system, which may or may not allow benefits to spouses and/or children. Employers generally also add to these employee contributions.

Social security narrowly defined may include pensions and provident and retirement annuity funds. In some countries with multiple retirement schemes, it is difficult to disaggregate data from different retirement schemes, because it is only presented in aggregate form. This causes difficulties when studying the effects of the individual retirement schemes in the economy. Therefore, in this study there is no distinction between different retirement schemes.

1.3 Justification of the Study

Since its introduction in 1891 by Bismark in Germany, retirement programs have been implemented in many countries. The motivation for the introduction of retirement schemes to provide for old age, arose from the observation that many individuals suffered during their retirement due to of lack of income to finance their needs. In the United States, the principal motivation for the implementation of retirement funds was to provide for those elderly individuals who had suffered loss of income during the 1930s depression and World War II, and who were not able to save enough for their retirement (Kotlikoff, 1987). In many developing countries retirement funds were introduced by former patrons (colonisers) and they took the shape of the social security regulation of the mother country. Thus, social security is not a new concept or practice to many developing countries, especially African ones. However, what is lacking in these countries is

successful practices that could serve as role model for policy design with regard to retirement programs.

In September 1994, The World Bank published a report entitled "*Averting the Old Age Crisis*" with the objective to evaluate the status of old age security around the world. The report notes that in many countries, particularly in developing ones, aged individuals suffer after they have retired. Explanations for this phenomenon include:

1. In some countries no pension scheme exists,

2. Deficient institutional structures constrain the provision of old age support,

3. In other countries contributions paid by workers during their lifetime earnings are deficiently managed, reducing the payouts of funds for retired individuals to becoming negative, with moral hazard[2] at the origin of deficient management,

4. In many developing countries, particularly African ones, government intervention and a poor investment portfolio may result in low benefit payouts that consequently discredit the system.

5. Excessive government intervention may also lead to mismanagement because retirement funds are easily accessible and at lower interest rates than the market rates, which may result in negative returns on the funds' investment.

6. Generous benefits may have distortionary effects on the economy, leading for example to early retirement which reduces the supply of experienced labour.

[2] Moral hazard is defined as actions of economic agents in maximizing their own utility to the detriment of others, in situations where they do not bear the full consequences or, equivalently, do not enjoy the full benefit of their actions due to uncertainty and incomplete or restricted contracts, which prevent the assignment of full damages (benefits) to the agent responsible (this is a externality problem). This actions cause divergence between private social costs of some action and social cost of that action, resulting in an allocation of resources which is not optimal (The MIT Dictionary of Modern Economics, 1992). Therefore, moral hazard arises due to opportunistic behaviour of economic agents in the act of maximising their own utility.

7. The sustainability of a pay-as-you-go system is questionable since it may require relatively high taxes or debt to be paid by future generations to provide the benefits promised to the elderly generation.

8. Evasion of social security contributions due to high taxes and poor benefits paid may be encouraged.

In view of the problems identified, the World Bank Report proposed changes to social security systems. They recommended that given the relatively large youthful population of African countries and the disfunctionality of social security systems (many of them designed only for public employees, excluding the majority of the population) should redesign their social security programs. They should also take cognisance of the impact of such systems on economic growth and human capital formation.

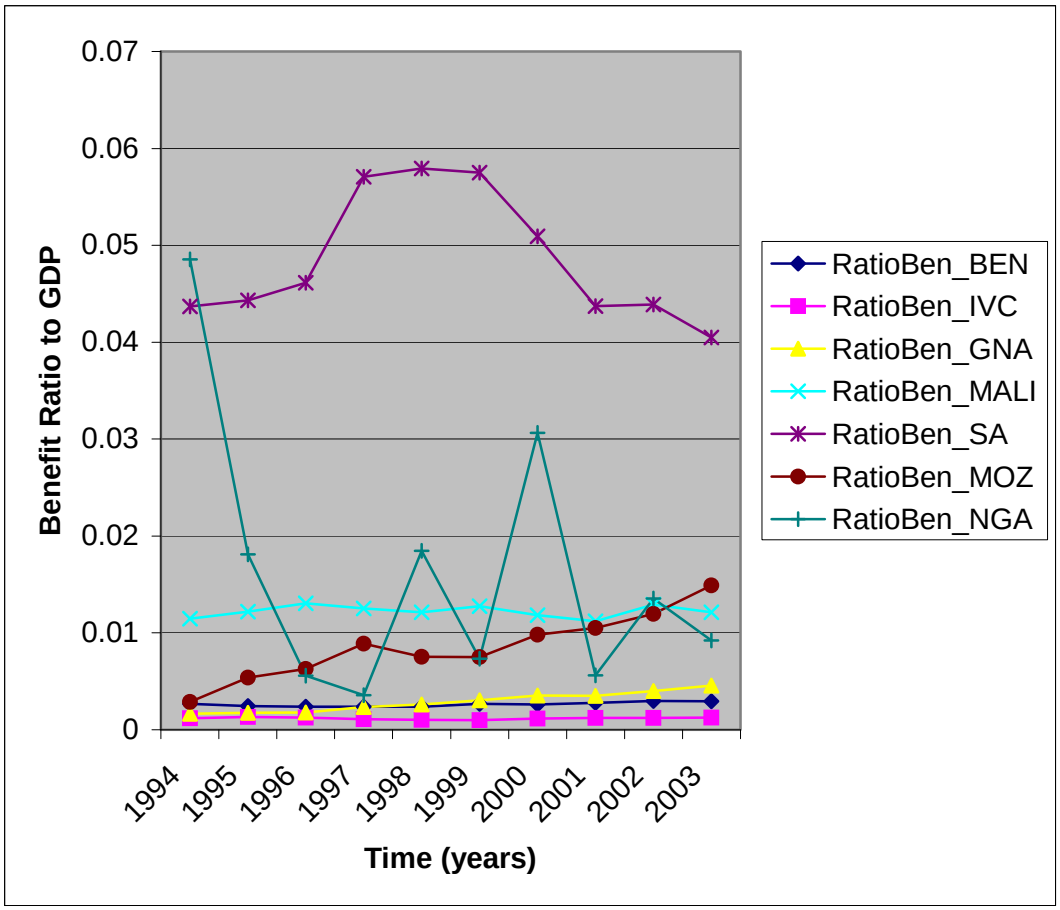
The Report proposed three pillars for social security programs: firstly, a program (first pillar) runs by government, with (i) a redistributive function and (ii) serving as insurance for possible losses from market operations. Secondly, a privately managed program, with the objective to improve the benefits received during retirement through highly profitable investments. Thirdly, personal saving, which is voluntary for those who want improved levels of benefits. The Report recommended that the first two programs be mandatory but with a strong regulatory system to ensure that individual managers do not misuse the contributions channelled into these funds. Against this background, an attempt has been made to evaluate the state of existing social security schemes in sub-Saharan African countries, especially the way in which such schemes have performed in terms of their contribution to economic growth and investment in human capital.

Figures 1- 4 show how social security, economic growth rates, fertility net of mortality (represented as population growth) and saving have evolved over time in a selected number of sub-Saharan African countries. Social security and saving are expressed as ratios of GDP (Gross Domestic Product).

Figure 1 shows the retirement benefit payments to GDP ratios to illustrate the evolution of retirement benefit payments from the existing retirement schemes in sub-Saharan African countries. It can be seen from the figure that except for South Africa (SA) and Mozambique (MOZ), the ratio of retirement benefit payments to GDP in all other countries included in the analysis were almost constant. In the case of South Africa the ratio increased over the first four years of the sample period, remained steady over the following three years and then kept declining up to the end of the sample period (2003).

In the case of Mozambique the ratio increased over the full sample period. In 1994, Nigeria had the highest retirement benefit payments to GDP ratio but it declined over the following four years after which it kept fluctuating.

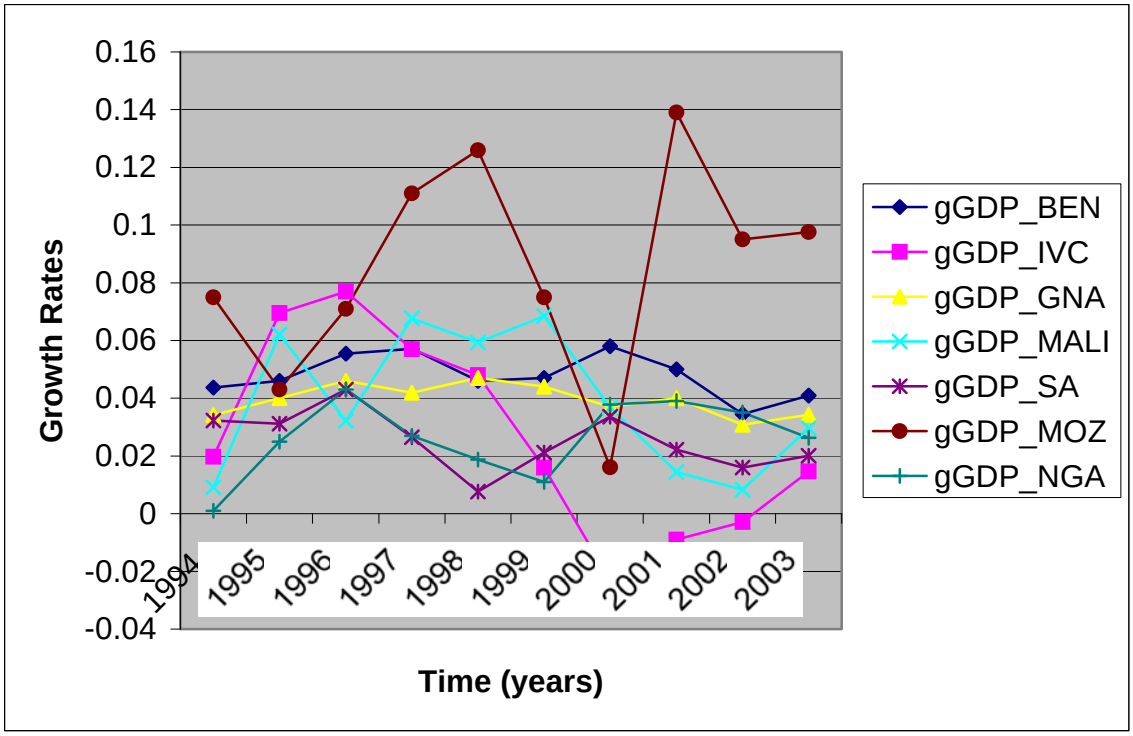
Figure 1: Retirement benefits/GDP ratio (1994-2003)



Source: IMF Country Report and World Development Indicators (2004 CD-ROM)
BEN=Benin; IVC=Ivory Cost; GNA=Ghana; Mali=Mali; SA=South Africa; MOZ=Mozambique and NGA=Nigeria

This suggests differences in policy treatment for retirement programs in different countries in the sample. As far as the rest of the countries included in the sample is concerned, the ratios remained fairly constant.

Figure 2: Growth rates in GDP per capita (1994-2003)

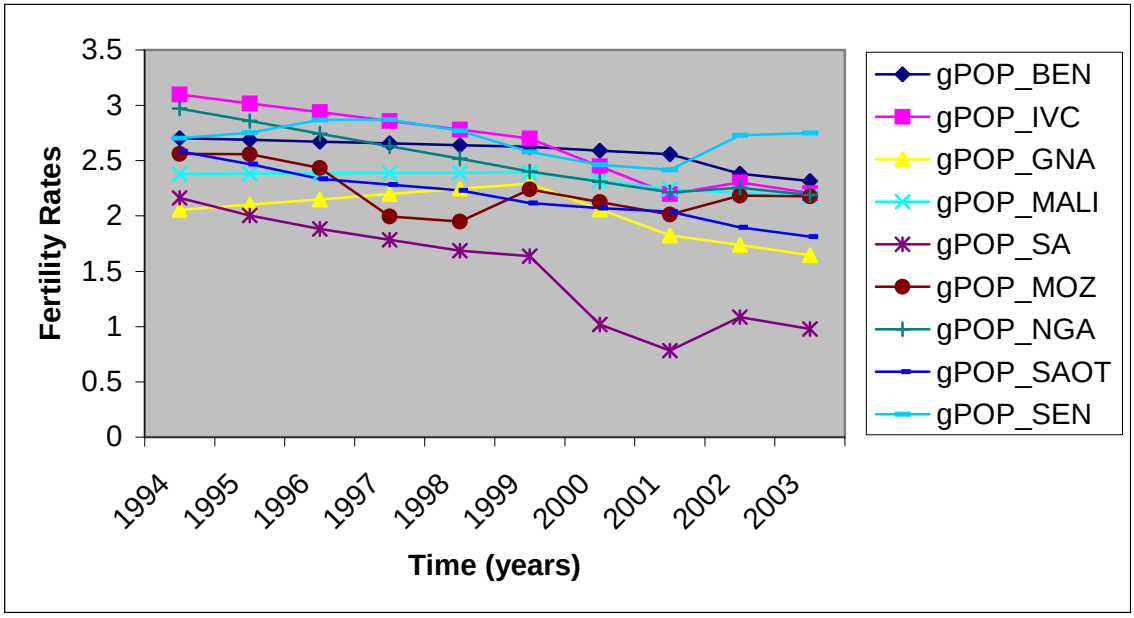


Source: IMF Country Report and World Development Indicators (2004 CD-ROM)

In Figure 2, the economic growth rates of the countries included in the analysis are portrayed. The majority of the countries show large fluctuations suggesting that the per capita growth GDP in these countries was unstable, except for Benin (BEN) and Ghana (GNA) in whose cases growth remained almost constant over the full sample period.

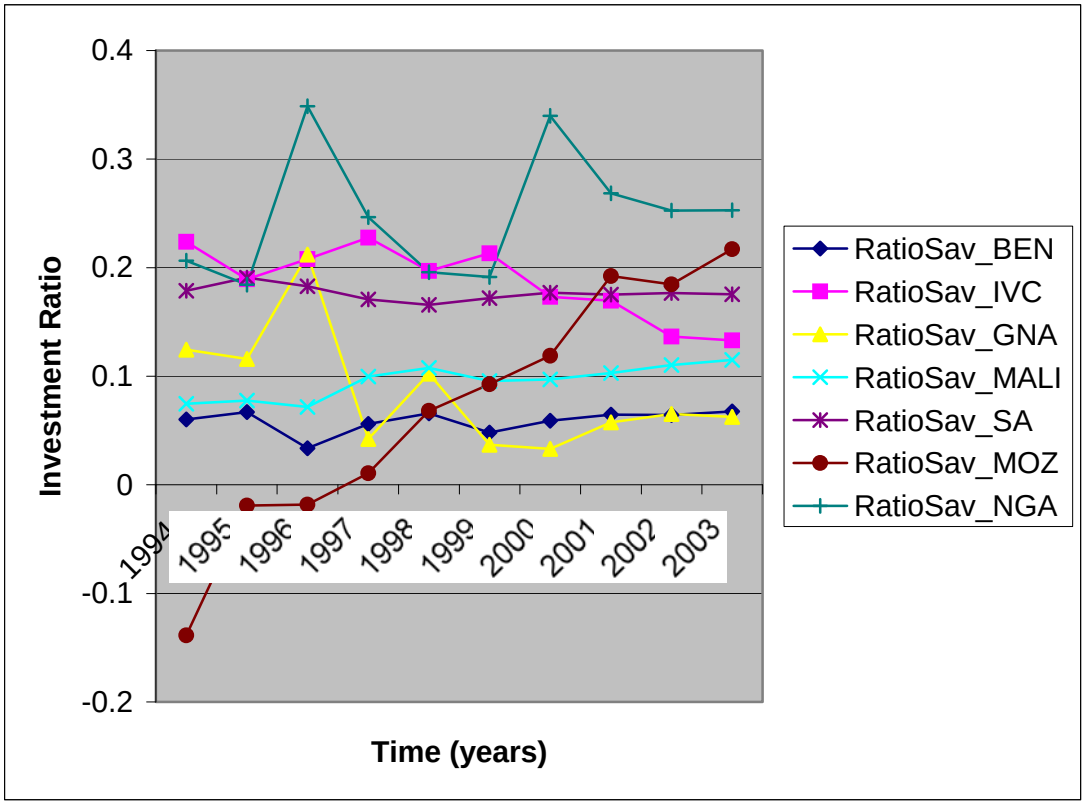
In Figure 3, by contrast, fertility rates (represented as the growth rate of the population) show decreasing tendencies in all countries. This scenario is similar to all other countries in the study. The effects of retirement programs on fertility rates and investment in human capital are an important consideration.

Figure 3: Fertility rates over the period 1994-2003



Source: IMF Country Report and World Development Indicators (2004 CD-ROM)
for SAOT=Sao Tome and Principe and SEN= Senegal

Figure 4: Investment/GDP ratio over the period 1994-2003



Source: IMF Country Report and World Development Indicators (2004 CD-ROM)

Figure 4 shows that similar to the retirement benefit to GDP ratios, investments as a proxy of saving have been growing strongly in Mozambique and Mali. In Benin they increased slightly over the period under study, while in all other countries the investment to GDP ratio remained almost constant.

Based on these tendencies the question is whether a correlation exists between retirement benefits paid and the macro variables outlined, namely: per capita GDP growth rates, fertility rates and investment as proxy of saving.

1.4 Problem Statement

This study seeks to understand and explain in the sub-Saharan African context, how the establishment of sound retirement schemes could contribute to economic growth, saving and reducing fertility rates. It investigates how the extension of retirement programs (also the growing informal sector) could contribute to poverty during retirement. The results should heighten the awareness of policymakers in SSA countries regarding the importance of retirement schemes in the performance of their economies such as its impact on the development of capital markets and consequently economic growth.

A significant number of studies (World Bank, 1994; Hu, 1979; Orszag and Stiglitz, 1999; Beck and Levine, 2004; Walker and Lefort, 2002 and Barrell, Davis and Pomerantz, 2004) show that in the United States, Chile (which serves as a model for reforming retirement schemes) and economies in transition, that the implementation of proper retirement schemes has had a positive effect on poverty alleviation amongst the aged and contributed substantially to the development of capital markets. Other studies that attempted an investigation of the relationship between social security and economic growth, include James (1998a and 1996), Beck and Levine (2004), World Bank (1994), Corsetti and Schmidt-Hebbel (1997) and Hu (2004). The question is do these phenomenon also applies to the SSA countries?

1.5 Objectives of the Study

The objectives of this study are: (i) to determine the impact of retirement funds in SSA countries on savings, economic growth and fertility using a panel data analysis; (ii) to identify possible factors that may affect the performance of retirement funds, such as lack of credible institutional arrangements; (iii) to raise awareness with policymakers in SSA countries regarding the impact that retirement programs may have on the performance of their economies. Awareness should especially be raised regarding poverty alleviation, which is a fundamental factor to economic growth and development. Lastly (iv) to analyse the way in which the growing informal sector in all sub-Saharan African countries could be involved in retirement programs, as part of poverty alleviation strategies aimed at both retirees and their dependants. This is also important in view of the high rates of unemployment in all SSA countries and for an integrated strategy of economic growth in the NEPAD or regional development programs.

1.6 Significance of the Study

Retirement funds constitute an important means of providing income to sustain the needs of the elderly and disabled. For many years governments have been providing retirement programs through a pay-as-you-go system. However this system, while still used in many countries, places a heavy burden on the budget, with tax revenue mostly insufficient to honour the required obligations for retirement expenditure. Because of this burden, governments may resort to public debt, issuing long-term bonds or raising taxes to finance this retirement expenditure.

Large government deficits and debts further contribute towards fiscal vulnerability and volatility. In addition they cause instability in social spending programs including retirement schemes. Because government does not accumulate funds for retirement benefits, depending on how these expenditures are financed, the provision thereof may have important policy effects on the economy.

Financing retirement benefits through deficits or taxes may have varying economic implications. One such is future generations having to bear the burden of providing for retirement of present generations due to the latter lack of saving. However, in the SSA case this seems to be unavoidable at present due to potentially high transaction costs, given the low income levels that prevent individuals to save for retirement. Underdeveloped capital markets also constrain the private sector from entering the retirement industry. Thus, government has to take the lead in the provision of retirement benefits through a mandatory PAYG scheme.

One of the aims of this study is to alert policymakers in SSA countries of the impact that policies directed at provision for retirement may have on the course of the economy. In addition to emphasising the importance of formulating this policy, the study is also meant to fill the gap in literature regarding economic growth and retirement programs in the sub-Saharan African countries. As confirmed by Zhang and Zhang (2004) few studies have been published that investigate the relationship between economic growth and retirement funds using a panel data analysis in SSA countries.

1.7 Hypothesis

As stated earlier, retirement programs contribute towards economic growth and reduce fertility rates if parents are willing to invest more in their children's education. This implies that the provision of retirement benefits could also contribute to human capital formation (Ehrlich and Kim, 2005). However, other studies (Kotlikoff, 1987; Feldstein, 1974, 1995; Nhabinde and Schoeman, 2005) have shown that the existence of social security programs reduces other forms of savings (such as discretionary saving) that could constrain economic growth. Thus, in this study three different but interrelated hypotheses are being tested namely:

1. The availability of retirement benefits reduces saving in sub-Saharan African countries

2. Retirement benefits contribute towards economic growth in SSA countries

3. The availability of retirement benefits reduces fertility in SSA countries

1.8 Limitations

As in many other studies involving developing countries and African countries in particular, a major limitation is the availability of data. Moreover, the fact that the majority of SSA countries have retirement programs only for civil servants and some major public enterprises, may limit the generalisation of the results found in this study. In addition, the presence of a wide range of institutional regulations as well as (mostly outdated) provident funds and social insurance[3], further constrains the generalisation of the results form this research. The problem is exacerbated when countries with similar schemes have different policies for retirement funds' investments, which may result in significant differences in benefit payments. Furthermore, corruption may also affect the performance of retirement funds, resulting in benefit payments that do not correctly reflect the history of contributions and the income generated by retirement funds. Another major limitation arising from the data is the lack of consistence in recording data series reflected in the limited data series and the many gaps in between.

In summary the differing and wide range of regulations, data recording, corruption and the fact that retirement programs in the majority of African countries were designed for only a limited segment of the population (civil servants and major public enterprises) may constitute the biggest limitations in the generalisation of results found in this study.

[3] Social insurance programs are designed to support individuals (workers) during periods of low or loss of income; for example, unemployment and retirement periods. These programs tend to have a specific duration, for example, the duration of unemployment or retirement and they are bounded by specific rules that individuals must satisfy in order to qualify for such programs. They are generally financed by tax contributions defined by laws on social security (or social insurance) programs in a specific country. Social insurance programs differ from social assistance programs in that in order to qualify an individual may not need to have contributed to a certain scheme for a specified period. Social assistance programs generally are non-contributory and provided by governments through general taxation and benefits are generally means-tested, in-kind benefits or any other form. These programs are designed to protect individuals from social exclusion; therefore, their aim is poverty alleviation.

Chapter 2: Literature Review

Since their introduction by Bismarck in Germany in 1891, retirement programs have been widely implemented worldwide. Bismarck's main objective was to provide old age retirees with a certain standard of living, thus assuring that individuals' income does not drop below a certain minimum level after retirement. The rapid growth of retirement programs since then (in number and quality of services) provides important evidence that individuals are risk averse, as they grow older. Hagemejer (2000) provides a list of nine risks and needs covered by a broad range of social protection expenditures, of which retirement benefits take a major slice (40 per cent) of these expenditures. Next the rationale and functions of social security schemes available are investigated.

2.1 The Rationale and Functions of Retirement Programs

Social security in the narrow definition of retirement programs basically entails the financing of retirement. Individuals receive benefit payments in the form of annuities during retirement until they die, allowing for a total or partial lump sum at the retirement date. Many of the retirement programs allow for surviving spouses and/or children to receive annuity benefits (Kotlikoff, 1987). The value of the benefits varies from one individual to another depending on the extent of their lifetime earnings. Retirement benefits are also paid to disabled individuals, providing for longevity, due to uncertainty of time of death. This uncertainty allows for possible substitution effects between lump sum (the one sum benefit from social security) and annuities.

Retirement programs also provide an important vehicle for intergenerational transfer of wealth. The PAYG system involves an efficient intergenerational transfer of resources if it is assumed that the economy follows Solow's (1956) model of balanced growth or Samuelson (1958) and Diamond's (1965) models of golden rule. The balanced growth or golden rule implies that once population growth has equalised to the growth in capital, government does not have to resort to debt under the PAYG system. In this case population growth is assumed to raise sufficient tax revenue to pay the benefits of retirees. This implies that the growth rates of wages and other outputs are equalised to the growth

rate of the population implying the Pareto equilibrium where all generations (present and future) are better off.

In the steady state economy it is assumed that government accumulates sufficient trust funds to pay for retired individuals, which in reality is not the case. In addition, population, capital, output and wages do not grow at the same rates, which means that the economy cannot maintain the golden rule or balanced growth of output. The result is that there is a surplus or deficit in the government collected tax revenue, implying higher or lower saving in the economy as in Solow's (1956) model. If an economy saves more it accumulates more capital than the population growth and, therefore, wages increase more rapidly. More taxes can be collected for social security purposes and the government need not resort to debt to finance retirement obligations, with the result that future generations are better off. The reverse is true if the economy saves less, in which case the government is forced to resort to debt to finance expenditure on social security. It is evident that social security is to some extent closely related to government deficit, resulting in future generations bearing the burden of lack of savings of present generations (Kotlikoff, 1987). All this provides the rationale (covering risk) and the function (improving the society's status) of retirement funds.

Inadequate private saving (Diamond, 1977) and purchases of life insurance (Auerbach and Kotlikoff, 1986) provide an important incentive for government intervention in order to secure social security and ensure that the economy continues to follow its growth path[4]. Inability in foreseeing the future health status of an individual obviously complicates the provision of social security to provide for all the different kinds of risks and needs. These difficulties also limit private insurance companies to provide products that would cover such risks, which raises the problem of adverse selection[5]. It is also argued that retirement

[4] The term "Growth path" substitutes "steady state", since the economy may not be growing at its steady state growth rate. In this case the provision of social security by government may guarantee that the economy continues growing at the actual growth path and eventually in the long-run follows its steady state growth rate (but with no guarantee).

[5] Adverse selection arises when a sub-population select a product that is likely to have less favourable characteristics than the population in general, for example a premium rate for life insurance may be fixed using the age-specific mortality rates for the population as a whole (The MIT Dictionary of Modern Economics, 1992). This concept implies that though the buyer and the seller of a product rank products of

funds contribute toward a Pareto improvement of the society by allowing intergenerational transfers of wealth with a risk sharing arrangement (Kotlikoff, 1987). Another reason for the introduction of social security systems as known today is the failure of family insurance systems to provide for old age security (Ehrlich and Lui, 1998). This is especially true of SSA countries where modest economic growth rates accompanied by many other exogenous factors have resulted in large scale migration of the labour force to other regions. The result is that traditional safe family insurance structures were weakened, and formal social security systems have become more viable[6].

2.2 A brief overview of retirement schemes around the world

In this paragraph an overview is presented of different social security systems in a number of selected countries. Old age security is featured by a variety of complex systems around the world and varying from country to country. However, most of these retirement schemes tend to be similar in nature regarding the form of administration and provision of old age income. The characteristics of each of these systems have evolved over time and with the changing demographic patterns since the late 1970s and early 1980s, developed countries were induced to reconsider the efficiency of their systems by reforming them (in some case in-depth reforms) to take into account the changing characteristics of their population. The majority of such reforms took place during the 1980s and 1990s but the process is still continuing.

In the majority of these countries social security systems tend to be dominated by PAYG defined benefit systems administered by government with contributions subsidised through tax incentives and payment of benefits includes a means-tested procedure. The problem with this type of social security system is that it constrains government finances

different quality in the same way, only the seller can observe the quality of each product he/she sells. The buyer can at most observe the distribution of the quality of goods previously sold. Without some device for the buyers to identify good products, bad products will always be sold with the good products (The MIT Dictionary of Modern Economics, 1992). Such a market illustrates the problem of adverse selection, which interferes with the effective operation of a market (Dictionary of Economics, 1987). Therefore, the problem of adverse selection arises due to asymmetric information between the sellers and the buyers.

[6] However, there are many factors that may affect the viability of social security schemes in most of the SSA countries, including the institutional setup among other factors as discussed in Chapter 3.

which could impose large implicit debts. However, in most recent years countries have been considering alternative forms of social security systems in order to reduce the strain on government finances. In this regard there has been a significant move of social security types, most of them designed to be of the PAYG type, to a new model of social security administration with the objective of lessening the burden both on government finances and the tax obligation on future generations. This section considers the existing social security schemes around the world and where possible reforms will also be reported.

2.2.1 Chile

The first Chilean social insurance system was introduced in 1924 (being the first country in the Americas to introduce social insurance). The Chilean system consists of a mandatory individual account, social insurance and social assistance system. The new system includes mandatory private individual accounts which were compulsory for workers entering the labour force as from December 31, 1982. It covers all private-sector employees, provides voluntary coverage to the self-employed, a wage earners' program with a minimum wage of 127,500 pesos, a salaried employees' program with special systems for railroad employees, seamen and port workers, public-sector employees, the armed forces, police and more than 30 other occupations (www.socialsecurity.gov).

The funds come from a mandatory individual account with the insured person contributing 10 per cent of gross earnings for old-age plus 0.75 per cent for disability and survivor insurance and an average of 1.55 per cent of gross earning for administrative fees. The employer does not contribute to any of these accounts, except 1 or 2 per cent of gross earnings for employees working under arduous conditions. For social insurance the insured person contributes 18.8 per cent of wages, while salaried employees contribute from 20 to 30 per cent of gross earning depending on the nature of occupation (a reduction of 7.75 per cent is granted to some workers with at least 40 years of contributions) and the employer is not required to contribute to this system (www.socialsecurity.gov).

Chile has the most cited reforming social security system, with a funded defined contribution (FDC) introduced in 1981 considered to be the most important development.

This FDC system is considered to have had a strong influence on the course of social security systems in the rest of the world. By the 1970s this scheme had covered about 70 per cent of the labour force (Williamson, 2005). The crisis the scheme experienced by late 1970s induced the Chilean government to divide it into separate PAYG plans each with its own rules with respect to eligibility and benefit levels. For example, full pension benefits after 35 years of contributions for some categories of workers and 30 years for government employees (Kitzer, 2000; Williamson, 2005; Myers, 1992). Williamson (2001) indicates that by 1980, the Chilean government was subsidising 28 per cent of pension payments. The new Chilean scheme is basically a fully funded scheme, but Williamson (2000) prefers to define it as a mixed or partially funded model since government still is contributing towards the funding of the system.

For new employees and also those who opted to shift from the old system to the FDC the contribution of wages is 10 per cent. This contribution is made to one of several privately management pension companies of their choice with an additional fee of between 2 and 3 per cent to such companies to cover the management costs and also to pay for survivors and disability insurance (Williamson, 2000). For employees covered by the old scheme (pre-1981 PAYG) who agreed to switch to the new scheme, employers had to increase wages by 18 per cent to ensure a real income increase of 11 per cent (Williamson, 2000; Kritzer, 1996).

The most recent changes in the Chilean FDC scheme include the 1999 reform with a shift from the use of 12 months to a 36 month accounting period when assessing compliance with rate return regulations (Williamson, 2000; Kritzer, 2000). In 2000 another reform was to allow asset managing companies to introduce a second fund (Fund 2) in addition to Fund 1 (the pre-existing fund) (see Williamson, 2000). Fund 2 was only for those who were within 10 years of retirement allowing for investment in fixed-income securities (Kritzer, 2002). In 2002 multi-funds were introduced in order to allow flexible investment in other markets such as the stock market that were not allowed before. These multi-funds encompass higher risk choices and lower risk choices of investment allowing workers to choose among the available investment alternatives.

2.2.2 United Kingdom

Old-age pension scheme (social insurance and social assistance system) was introduced for the first time in the UK in 1908 while in 1911 and 1925, disability insurance and old-age and survivors' insurance schemes respectively were introduced. The current laws on retirement were introduced in 1992 (consolidated legislation), in 1995 pensions, in 1999 welfare reforms and pensions and in 2000 child support, pensions, and social security. It covers all persons aged 16 to 65 (men) or aged 16 to 60 (women). The source of funds is from contributions by insured persons (11 per cent) and employers (12.8 per cent), with self-employed and voluntary contributions also allowed (www.socialsecurity.gov).

The United Kingdom (UK) state pension scheme is three-tiered: the basic state pension, the state earning-related pension scheme (SERPS) and the income support and invalidity benefits. The first tier of the state pension is a flat-rate contributory benefit payable to people aged 65 for men and 60 for women. The individual meets the qualifying conditions if he/she has made contributions to the National Insurance Fund for 90 per cent of their working lives but since the introduction of Home Responsibilities Protection act in 1978 the number of years of contributions can be reduced by the time spent on caring for children or dependents (Blundell and Emmerson, 2003). By April 2003, the basic state pension was worth £7.45 a week for a single pensioner. Before 1978 married women were allowed to opt to pay only a reduced amount to National Insurance Fund and, therefore, did not qualify for the basic state pension. Since 1989 there has not been an earnings test for a basic state pension.

Introduced in 1978 the SERPS scheme pays a pension equal to a proportion of an individual's annual earnings per year. The intention is to pay a pension worth one-quarter of the contributor's best twenty years of earnings, up to a specific upper earnings limit. Women who opt for a reduced payment to the National Insurance Fund do not qualify for the SERPS scheme (Blundell and Emmerson, 2003). However, widows can currently claim their husbands' SERPS pension in full if they receive no additional pension in their own right. SERPS pension is updated each year after retirement in line with inflation.

Another state benefit paid to elderly non-workers is an income support and incapacity grant. The income support grant is a non-contributory means-tested benefit payable to those aged 60 and above who fall into the lower income groups (Blundell and Emmerson, 2003). The beneficiaries of this flat-rate means-tested benefit are not required to show that they are not actively seeking work in order to qualify. In 1999, the income support was renamed to a minimum income guarantee. The generosity of the means-tested benefits was extended with the introduction of a pension credit in October 2003, payable to lower income individuals aged 65 and above (Blundell and Emmerson, 2003).

While the minimum income guarantee is non-contributory, an incapacity benefit was introduced in 1995 as a contributory benefit paid to the long-term sick and disabled and can be paid only to individuals aged under the state pension age. During the 1980s the rapid growth in receipts motivated the change from invalidity benefits to incapacity benefits, which before April 2001, did not follows the means-tested benefit procedure and could be received in conjunction with private pension income. However, since then means-tested benefit payments are applicable regard to individual occupational pension income (Blundell and Emmerson, 2003; www.socialsecurity.gov).

The reforms to SERPS introduced in 1986 and 1995 reduced its generosity for those qualifying for state pension after 2000. This reform came along with a choice to individuals to opt out of SERPS to join the defined contribution scheme from 1988 or individual retirement accounts (Blundell and Emmerson, 2003; www.socialsecurity.gov). Members of the defined benefit and contribution occupational schemes pay a reduced rate of National Insurance while those with personal stakeholder pensions receive a National Insurance rebate paid directly into their funds. There was a decline in coverage of occupational pension plans from 11 million to 10.1 million between the mid-1980s and 2000. According to Blundell and Emmerson (2003) such a decline reflects the employment patterns and a shift to smaller employers, but also the wide range of pension choices among individuals working for employers offering occupational pensions.

Most of the reforms introduced in the UK retirement schemes were meant to improve the social status of the aged and also reduce the generosity of existing schemes. Moreover, these reforms offered possibilities for working individuals to choose among the different retirement schemes and, therefore, giving individuals the chance to change schemes if not

satisfied. Such behavioural responses to reforms are currently considered in a number of studies with some implicating that an increase in the retirement age would lead to a significant increase in government revenue ((Blundell and Emmerson, 2003).

2.2.3 Sweden

In Sweden social security programs started with a universal and social insurance system which was later transformed into a unified social insurance and individual notional and mandatory individual accounts system. The first scheme of this nature (first law) was introduced in 1913. In 1999, a new system of social insurance notional accounts plus a mandatory individual premium pension accounts system were established. The old Swedish system covered all employed and self-employed people earning in excess of 40,100 kronor a year. The new system covers all individuals and self-employed people earning above 17,800 kronor a year and all residents qualify for a guaranteed pension (both old and new systems). The funds are sourced from insured persons (7 per cent of assessable income up to 341,300 kronor) for old age insurance; the self-employed contribute 7 per cent of assessable income (up to 341,300 kronor) plus 10.21 per cent of assessable income for old age insurance and 1.70 per cent of assessable income for survivor pension. The employer contributes 10.21 per cent of its payroll to old-age pension, plus a 1.7 per cent of the payroll to survivors. The government bears the total cost of guaranteed pension and permanent disability benefits and it also pays earnings-related benefits to government civil servants (www.socialsecurity.gov).

The old system provided individuals with a minimum protection in the form of a flat rate basic pension for all and various grants to those without income or low income groups. The earnings-related pension was provided for by a PAYG scheme which covered earnings up to a certain maximum (Scherman, 1999). The benefit payments under the old PAYG system implied pension indexation to inflation rather than economic growth, which caused severe financial problems, making it unsustainable.

Due to such unsustainability the Swedish parliament passed a law in June 1998 introducing a new old-age pension system which implemented in January 1999

(Scherman, 1999). However, according to Scherman, reforms in Sweden already started in the mid-1980s, with the abolition of a long life widows' pension which was replaced by a temporary adjustment pension for both widows and widowers and an improved child pension scheme. Under the reformed system the old-age system is separated from disability pensions. The new old-age system contains an earnings-related part that provides protection to those with no or only a low earnings-related pension (Scherman, 1999; www.socialsecurity.gov). The new public earning-related scheme encompasses two parts namely, a PAYG and a fully funded scheme financed through a 16 per cent tax contribution plus a contribution to the premium reserve scheme of 2.5 per cent (www.socialsecurity.gov).

The new Swedish PAYG system is considered to be less generous than the old system which makes it more sustainable with an indefinite and stable contribution rate playing a more significant role than the old system (Scherman, 1999).

2.2.4 Denmark

The problems facing the Danish universal, social insurance and mandatory individual account system are similar to those in other developed countries, that is, Denmark faces major future demographic changes of which it has to take care. The first retirement scheme (first law) dates back to 1891 with disability being legislated in 1921. The current laws on retirement schemes include the labour-market supplementary pension (ATP) of 1964, with a 1998 amendment (special pension saving scheme, SP) implemented in 1999 and a 2000 amendment implemented in 2002. Also, the 1984 law on universal old-age and disability pensions as amended in 1986 (partial early retirement pension with amendments) (www.socialsecurity.gov).

The universal pension covers resident citizens aged 16 to 66 (aged 16 to 69 as from July, 2004) as well as non-citizens meeting the minimum residence requirements. The labour-market supplementary pension (ATP) scheme covers employees 16 to 66 (aged 16 to 69 as from July 2004), including persons on partial leave or recipients of cash sickness or unemployment benefits. The special pension saving (SP) scheme covers employees aged

16 to 66 (age 16 to 69 as from July 2004), including persons on partial leave, recipients of cash sickness or unemployment benefits and the self-employed. The funds are sourced from an insured person up to a maximum of 894 kronor per year for a full-time worker if on the ATP program. Contributions of one per cent of gross income to the SP program were suspended for 2004 and 2005. Employers contribute 1,788 kronor per employee per year (full-time worker) if on the ATP. The government bears the cost of a universal basic pension scheme (www.socialsecurity.gov).

The Danish social security system is a mixed public-private sector arrangement, with the labour market-related program open to those 60-66 years old. The universal program (National Old-Age Pension – OAP) is a means-tested program based on employment earnings (Bingley, Gupta and Pedersen, 2005) and individuals are entitled to this program if older than 67 years. The 1999 reforms reduced the official retirement age from 67 to 65 with the objective to increase the average actual retirement age (currently 61.5 years).

The reforms in the Danish retirement schemes seem to be motivated by the expected changes in its demographic structure and also to increase the average actual retirement age. It is expected that in 2040 the dependency ratio in Denmark will decrease from 4 to about 2.5 per individual older than 65 years, with an expected strong effect on government finances (Bingley, Gupta and Pderson, 2005).

2.2.5 Australia

The Australian social assistance and mandatory occupational pension system was firstly introduced in 1908 with the objective to take care of the old-age and disabled and in 1942 it was extended to take care of widows as well. The current laws providing for old-age pension were introduced in 1991 (social security), 1992 (superannuation guarantee), and in 1999 (the new system) (www.socialsecurity.gov). Social assistance covers all persons residing in Australia; superannuation or mandatory occupational pension covers all employed persons older than 17 years but younger than 70 years earning more than A$450 a month. The self-employed are excluded from the system. Funds for the superannuation system are sourced on a voluntary basis and is tax deductible up to a maximum of

A$5,000 plus 75 per cent of a contribution in excess of this amount or the aged-based contribution (younger than 35, A$15,260; aged 35 to 49, A$42,385; aged 50 and above, A$105,113) whichever is lower. There is no upper limit for voluntary contributions. The employer contributes 9 per cent of basic wages up to a maximum of A$35,240 per quarter. The employer contributions are tax deductible up to a certain limit, depending on the age of employee. For employees younger than 35, the maximum annual tax deductible wage is A$15,260; if aged 35 to 49, A$42,385; or if aged 50 and above, A$105,113. The government bears the total cost for social security benefit payments from current general revenue and matches the voluntary contributions made by the insured on the basis of A$1.50 for each A$1.00 contributed up to A$1,500 per annum for low-income earners (www.socialsecurity.gov).

The occupational superannuation schemes are generally employer-sponsored pension plans. These programs were largely confined to white-collar government workers, employees of financial organisations, and workers in large manufacturing entitles. From the mid-1970s and throughout the 1980s Australia experienced a rapid growth of private coverage with pension schemes becoming more of an industrial issue (Schulz, 2005). Contributions to these schemes increased from 45 per cent in 1982 to around 70 per cent by the end of the decade, with nearly half of this growth from government employees, with the most common pension payout being lump-sum payments and government schemes that are annuity based (Schulz, 2005). The national wage case hearing in 1986 resulted in an increased superannuation coverage at the same time when it became compulsory that required savings accumulated in superannuation funds be both transferable and preserved until the age of 55 (Borowski, 2005).

In July 1992 superannuation guarantee (SG) funds took effect with all employers without pension plans for their employees required to pay a minimum of 3 per cent (expected to increase progressively up to a maximum of 9 per cent of an employee's salary into an individual superannuation account). The expected maximum was reached in 2002, with the result that about 90 per cent of Australian workers (almost all full-time and a quarter of part-time workers) are now covered by superannuation (Stanford, 2003). The introduction of the SG scheme in Australia is regarded as a victory for leaders in the labour party in terms of policies favouring an ideological shift towards reliance on market forces and the

liberalising of macro-economic management (Olsberg, 1997; Schulz, 2005). However, Bryan (2004) interprets this shift as being motivated by a lack of national saving to deal with the financial challenges of the ageing of the population. Thus, either government needed to increase its claim on national savings via taxation to fund a public pension scheme, or private saving for old-age has to be mandated to reduce the burden on the future welfare budget. The private saving choice prevailed and therefore, superannuation was introduced. However, there still seems to be considerable controversy regarding the nature and impact of the type of national saving (Bryan, 2004).

2.2.6 Japan

Old-age programs in Japan are of a social insurance type and managed through a PAYG system. It was first established in 1941 as an employees' pension insurance, with the relevant current laws dating from 1954 (employees' pension insurance) and 1959 (national pension) as amended in 1985. The system involves a flat-rate benefit for all residents under the national program and earnings-related benefits according to the employees' pension insurance program or other employment-related programs (www.socialsecurity.gov). The National pension program covers persons residing in Japan aged 20 to 59; voluntary coverage for persons residing in Japan aged 60 to 64 and for citizens residing abroad aged 20 to 64 (age 69 in special cases). Employees' pension insurance covers employees in industry and commerce, including seamen (partial contracting-out from employees' pension insurance is allowed if corporate plans provide for equivalent or higher benefits). The source of funds for employees' pension insurance is a contribution of 7.3 per cent (September 2006) of basic monthly earnings and a salary bonus before tax; miners and seamen contribute 7.9 per cent (September 2006) of basic monthly earnings including a salary bonus before tax from an insured person (www.socialsecurity.gov). The employer's contribution is 7.3 per cent (September 2006) of the monthly payroll including salary bonuses before tax. For the national pension program, government bears one-third of the total burden plus 25/1000 (increasing to one-half by the end of fiscal year 2009) of the cost of benefits and 100 per cent of administrative costs, financed by national tax. The total cost of administering employees' pension insurance is also financed through national taxes (www.socialsecurity.gov).

The Kosei-Nenkin-Hoken (KNH) is the principal program for private sector employees; while government employees, private school teachers and employees in agriculture/forestry/fishing organisations are covered by a special program provided by Kyosai-Kumial (mutual aid associations) with almost the same structure as the KNH system. The system operates two tiers: one pays flat-rate basic pension (Kiso Nenkin) benefits, applied to all residents (employees, unpaid families and self-employed). The other pays earnings-related benefits only to private and public employees with benefits indexed to inflation every year in terms of consumer prices and adjusted for wage growth every five years. An individual qualifies for the KNH flat-rate if he/she had reached the age of 65 years before 1999. However, if the individual had retired after that date he/she would get full benefits at age 60 (Oishi and Oshio, 2006). Japan has reformed its retirement programs in 2000 with the objective to lower contributions paid by future generations and making the benefits less generous than the 1994 reform (Oishi and Oshio, 2006).

2.2.7 Taiwan

In 1950 Taiwan introduced the first law on social insurance systems with a lump-sum benefit based on 36 times the last working month's salary (Hu, *et al*., 2000). The current laws were introduced in 1958 (labour insurance) and implemented in 1960, with amendments in 1988, 1994, 2000, 2001 and 2003.

The Taiwanese public employees' insurance programs and the labour insurance programs are financed by a PAYG system. This system is likely to cause serious problems to government finances in the near future given the rapid ageing of the population. It covers employees between ages 15 and 60 in firms in industry and commerce, mines and plantations with five or more workers; wage-earning public-sector employees; public-utility employees; fishermen and some self-employed persons in service occupations. Voluntary coverage applies to employees in firms with fewer than five workers, the self-employed (except for those in service occupations with compulsory coverage), employees older than age 60 working in covered employment and persons involuntarily unemployed

with 15 years of coverage. Special systems for civil servants, farmers, salaried public-sector employees and the staff of private schools exist.

The insured person contributes 1.1 per cent of gross monthly earnings with maximum monthly contributions at NT$43,900 (adjusted according to changes in minimum wage). The contributions for self-employed are set at 3.3 per cent of gross monthly income with maximum monthly earnings for contributions at NT$43,900 (adjusted according to changes in minimum wage). The employer contributes 3.8 per cent of its monthly payroll with the maximum monthly earnings for contributions at NT$43,900 (adjusted according to changes in minimum wage); while the government contributes 0.55 per cent of employee wages (self-employed 2.2 per cent of income) and the cost of administration, with maximum monthly earnings for contributions at NT$43,900 (adjusted according to changes in minimum wage) (www.socialsecurity.gov).

Hu, *et al.* (2000) indicate that the population of Taiwan is ageing at a more rapid rate than that of western nations. The authors cite the Council for Economic Planning and Development, 1999: Table 3 as their source of information which indicates that the share of the population aged 65 and above is projected to be 9.9 per cent by 2010 and 21 per cent by 2035. The dependence ratio is also projected to rise from 15.3 per cent in 1996 to 17.4 per cent in 2010 and 42.0 per cent by 2035 (Hu, *et al.*, 2000).

Contrary to this system, most social security systems in other Asian countries are partially or fully funded. An example of such a system in other Asian countries is that of Singapore with old-age pensions in that country fully funded through individual saving accounts and managed by a provident fund with the contribution to this provident fund set at 20 per cent of the worker's earning. At the retirement age of 65, a worker in Singapore is paid a lump-sum equal to the total employer and employee contributions, plus at least 5.5 per cent compound interest, less the amount of s$15,000 that is put aside for medical emergences (Hu, *et al.*, 2000).

The Taiwanese economy is dominated by small and medium enterprises with many self-employed workers. The majority of working in these entities is not covered by any type of social insurance available in the country (Hu, *et al.*, 2000). However, Hu, *et al.* also refer

to a proposed new social security system that would revise the public employees program and labour pension program and at the same time create a National Pension Program (similar to the Japanese system) to cover those not yet insured by either of the existing programs.

The new devised program is a defined-benefit program with all individuals receiving an identical flat monthly benefit that provides only for basic living expenses. The full benefit set to be 65 per cent of average consumption expenditure in the preceding two years; it also sets the minimum guaranteed benefit levels at NT$2,000 per month and all benefits are indexed to the consumer price index (Hu, *et al.*, 2000). This new system seems to be partially funded. However, the authors warn that the new system will have negative effects on aggregate saving due to the rapid ageing of the Taiwanese population because the negative saving effect will be relatively small in the first ten years but that it will increase after that. They also suggest that the funding ratio be increased to sustain growth and living standards.

2.2.8 Canada

The Canadian old-age security system (OAS) introduced in 1952, replacing the means-tested benefit system that had been in operation since 1927 and is managed at a provincial level. It is available to anyone aged 65 and above meeting the residence requirements. In 1995 the benefit payments from OAS pension in 1995 amounted to 19 per cent of the median monthly earnings of 20-64 year old males in Canada (www.socialsecurity.gov). Individuals not meeting the residence qualifying conditions receive entitlement for a partial OAS benefit and it has been indexed to the consumer price index since 1972. These benefits are fully taxable both by federal and provincial income taxes.

The largest component of the social security system in Canada is the Canada Pension Plan (CPP) and the Quebec Pension Plan (QPP). Both programs administered by Quebec and the rest of Canada were introduced in 1966 (Gruber, 1997). The source of funding for the plan is through a payroll tax of 2.7 per cent each on both employer and employees and levied up to the maximum pensionable earnings of the year (YMPE) (www.socialsecurity.gov). The YMPE is indexed to the growth in average wages in

Canada. The eligibility to the plan is conditioned on contributions for at least one calendar year during the contributory period from ages 18 to 65.

Before 1984 the QPP and before 1987 the CPP benefits could not be claimed before 65 years of age and no adjustment for delayed claims existed (Gruber, 1997; www.socialsecurity.gov). Since then individuals can claim benefit payments as early as age 60 with a reduction of 0.5 per cent per month for early claiming before the age of 65 and an increase of 0.5 per cent per month for delayed claiming after the age of 65 (Gruber, 1997; www.socialsecurity.gov). In 1975 the earning tests were eliminated and reintroduced in 1984 and 1987 with the introduction of early retirement, implying that workers can only claim benefits if their annual earnings do not exceed the maximum retirement pension payable at age 65 for the year in which the pension is claimed (Gruber, 1997). The benefits from CPP/QPP are indexed to the consumer price index and fully taxable by the federal and provincial income taxes (Gruber, 1997; www.socialsecurity.gov).

In addition to the above system there a means-tested guaranteed income supplement (GIS) was introduced in 1967 available to recipients of OAS, with the level for income means-testing defined in the same way than for income tax purposes. A means-tested spouse allowance (SPA) introduced in 1975 is also available on a monthly basis to 60-64 year old spouses of OAS recipients and to 60-64 year old widows/widowers (Gruber, 1997; www.socialsecurity.gov).

There are also a number of provincial programs that provide supplements to low income retirees and disability insurance (DI) programs that operate through the CPP and QPP systems. The DI program provides benefits to workers unable to work due to disability, where the basic benefits structure consists of two portions: a flat-rate portion paying a lump-sum to all disabled individuals and an earning-related portion paying 75 per cent of the applicable CPP and QPP, calculated with the contributory period ending at the date of disability. Gruber (1996) shows that although this program is fairly stringently screened, its structure of benefits has an important effect on labour supply.

Privately defined benefit pension plans are available to individual workers with the same incentive features as that for public insurance plans, called occupational pensions of RRPs. In 1992, 47.5 per cent of paid workers were covered by these systems, where 90 per cent of members were covered by defined benefit plans, with the share of defined contributions also growing slightly in most recent years (Gruber, 1997). Gruber argues that these defined contribution plans may affect retirement through the income effect only if no tax subsidy exists on the decision to work since payouts are not dependent on work patterns.

This section illustrated that there are important lesson to be learnt from retirement programs existing around the world:

(i) All schemes allow contributions for both private and government managed funds,

(ii) Since the early 1980s the majority of schemes have been adjusted continuously due to changes in demographic patterns that originate financial constraints to the government budget, in particular for developed countries,

(iii) Private saving for retirement clearly not sufficient, in particular from the beginning of the 1980s, and

(iv) The higher rates of unemployment, including informally employed (self-employed) of the labour force, the large is the government budget.

These features of social security programs around the world illustrate that these programs may have significant impact in the economy. Therefore, the following sections analyse, based on existing literature, the effects of social security on saving, growth in output and fertility.

2.3 Empirical Literature

A voluminous literature exists with regard to the impact of social security programs on the economies of many regions around the world. Unfortunately studies on African countries

and sub-Saharan African countries in particular are lacking, probably due to a shortage of statistical information or poor data recording. However, studies on other parts of the world, especially other developing countries such as Latin-American and Asian countries, could serve as useful references in an attempt to study retirement programs in sub-Saharan African countries. This section highlights some of the empirical work that has been done in the assessment of the impact of retirement programs in different economies. This is relevant to sub-Saharan African countries in view of their policies for poverty alleviation and sustainable economic growth. In particular this section analyses the empirical work regarding the impact of social security on saving, growth and fertility.

2.3.1 Social security and saving

Almost all the economists in the identified studies agree that social security programs, in one way or another, play an important role in boosting national saving. They do however, differ markedly in terms of the nature of the social security program that contributes to national saving. James (1998, 1996), the World Bank (1994), Feldstein (1998), Holzamann (1997, 2000) and many others believe that only pre-funding or defined contributions to privately managed social security programs are capable of contributing to national saving. Others like Orszig and Sitglitz (1999), Orszig (1999) and Barr (2000, 2002) believe that it is not pre-funding *per se* that contributes to national saving, but the regulation constraints imposed on pure pay-as-you-go systems. Should those legislative constraints be removed and the systems allowed to hold assets similar to those of pre-funding privately managed social security schemes, the effects of them, irrespective of being publicly or privately managed, would be indifferent. Others argue that the structure of the population plays a significant role in the national rates of saving (Disney, 1996; Masson, *et al*., 1995).

Studies show that there is mixed evidence regarding the nature of retirement schemes that contribute to saving. At the individual level Davis and Hu (2004) argue that "*A strong effect of funding on personal saving appears a priori unlikely to hold*". The main argument is that there is a substitution effect between pre-funding (as part of household assets) and other forms of saving. However, the illiquidity of pension assets may imply that this

substitution effect does not occur on a one-to-one basis (Pesando, 1992). Also, in many instances the legislation on pension systems does not allow future pension benefits to be used in mortgaging (Cifuentes and Valdes-Prieto, 1997), which may induce individuals to save. The imperfection of capital markets and other liquidity constraints do not allow individuals to borrow freely in the markets, thereby compelling them to save (Hubbard, 1986).

Although it is a contentious concept, shifting from unfunded to pre-funded systems is thought to increase personal saving (World Bank, 1994; Feldstein, 1995). Because of the decreasing saving rates since the 1980s, tax incentives that increase returns on saving via pension funds, have been thought to have a positive effect on aggregate saving (McCarthy and Neuberger, 2004). Tests on US defined benefit funds indicate that personal saving has increased between 0.35-0.5 for every unit increase of pension fund assets (Pesando, 1992). Feldstein (1995) found an increase of 0.5 for the decrease in US social security wealth. Davis and Hu (2004) indicate that the cost of tax incentives to pension funds reduces the overall benefit of national savings by around 0.2. Edwards (1995) suggests that unfunded pay-as-you-go social security systems reduce private saving. Nhabinde and Schoeman (2005) estimated a reduction on personal saving of 0.33 per cent for South Africa. Rossi and Visco (1995) estimated a reduction in personal saving of 0.66 for Italy. Cigno, *et al.* (2003) found that public pension funds have positive effects on saving in a time-series data for a number of countries.

James (1996) argued that the main advantage of the World Bank multi-pillar model is that it increases national saving. But Davis and Hu (2004) argue that the effect on personal saving of the growth of pension funds could be offset at the national level by the fall in public saving. This is due to transition costs involved in the shift from publicly managed pension funds to privately managed ones, as well as the cost of the tax subsidies to personal saving and the guarantees that government offers in the course of the transition.

It is crucial how government finances the transition costs, as well as the cost of guarantees. Cesaratto (2003) argues that if government finances the implicit debt by borrowing, public saving would decrease and national saving would remain unchanged or even decrease depending on the response of private saving and on how much the public saving falls.

Unless the marginal propensity to consume retirement benefits is equal to one, the effects of retirement funds in the Barro (1974) model are unclear if government issues debt to finance social security. It follows that the reduction in individual resources may be more or less than the reduction in intertemporal consumption of individuals.

In their simulation Hviding and Merette (1998) found that debt financed transition costs may have no effect on national saving and output. Davis and Hu (2004) argue *ceteris paribus* that if the transition costs are partly financed by taxes; national saving is likely to increase as public saving would not decline significantly. In the long-run, however, transition costs financed by taxes are likely to cause a small increase in national saving (Cifuentes and Valdes-Prieto, 1997). According to Barro (1974), taxes raised to finance retirement programs will have no effect on saving, given the Ricardian equivalence.

According to the life cycle hypothesis models developed by Ando and Modigliani (1963), personal saving will be crowded-out when government finances retirement programs through taxes or debt. Kotlikoff (1979) estimates that "*in these models a 10 per cent tax rate of contribution to retirement funds reduces the steady state of capital stock by 20 per cent*", a phenomenon that may have serious implications for economic growth as discussed in the next section.

Although the impact of contributions to retirement schemes in the life cycle models has been accepted by most economists, there is disagreement with regard to the magnitude of the effects. Leimer and Lesnoy (1982) estimate the marginal propensity to consume social security wealth at 0.011 while Feldstein's (1974, 1995) estimates are 0.021 and 0.028, respectively. However, Leimer and Lesnoy's estimates were not statistically significant, while the Feldstein estimates were statistically significant. Interpreting these results, the Leimer and Lesnoy findings may imply that retirement funds have no effect on saving, while the Feldstein findings indicate that contributions to retirement schemes may significantly affect savings.

Schmidt-Hebbel (1999a) estimates that pension reforms in Chile contributed to an increase in the national saving rate regardless of how pension reforms were financed. He suggests that pension reforms can explain a rise in national saving of between 9.8 per cent and 45

per cent. Holzamann (1997) also suggests that aggregate savings in Chile increase with pension reform. In a panel data analysis Samwick (1999) finds that no countries except Chile, experienced an increase in gross national saving rates after implementing pension reforms towards non-PAYG systems. This conforms to what Orszig and Stiglitz (1999) and others have been arguing namely that it is not the shifting towards privately funded social security schemes that increases saving, but the removal of constraints imposed by legislation on PAYG holding assets, could produce similar results.

Furthermore, Samuelson (1975) argues that greater public thrift lowers the need for private thrift, "*and with uncertainty aside, the precise allocation between the two is a matter of indifference*". As he further argues, this perception implies that people tend to become myopic as paternalism becomes optimal, that is, individuals cannot see how private saving can "*offset what the mandatory system is doing to them*". These findings tend to favour the argument that retirement schemes crowd out private saving in life cycle models where bequest motives are non-operative, but at the same time they tend to favour the paternalistic intervention of government due to the myopic behaviour of individuals.

2.3.2 Social security and growth

Only a few empirical studies could be found on the effect of retirement funding on economic growth using panel data analysis. Zhang and Zhang (2004) quote Ehrlich and Zhong (1998) who studied a sample of 49 countries over 29 years as probably the only study published on this issue. Unfortunately there were no African countries among them. These studies found a positive relationship between retirement schemes and growth in a panel data analysis using a set of developing and developed countries. However, Ehrlich and Lui (1998) using a model where social security rates are treated econometrically as endogenous variables, showed that PAYG social security taxes have non-trivial effects on the long-run growth rate of the economy.

Davis and Hu (2004) also indicate that studies investigating the direct relationship between funded social security and growth are relatively sparse. Following Barr (2000) there are three steps (that do not necessarily hold) through which funded social security can induce economic growth: Firstly, pension reform leads to higher saving rates.

Secondly, the higher levels of saving are translated into more productive investment, and thirdly, investment results in increased output. On the other hand various authors argue that funding induces growth via improvement in market efficiency (Catalan, Impavido and Musalem, 2000; Schmidt-Hebbel, 1999a; Davis and Hu, 2004) and "incentives operating outside the saving-investment nexus" (Davis and Hu, 2004), like the growth in output in endogenous growth models.

Barro (1989) found that government transfers have a negative effect on fertility and saving but a positive effect on growth. In a study where he attempts to control for endogeneity of social security, Wigger (1999) found that retirement programs stimulate per capita growth and fertility for both developed and developing countries, but only if growth and fertility are primary policy concerns. Such effects increase investment in human capital without affecting saving rates, but growth does not cause changes in the rate of retirement benefits to income, a kind of "Aaron-condition". Schmidt-Hebbel (1999b) concluded that of 13 per cent private investment and average productivity of capital, pension reforms contributed between 0.4 to 1.5 per cent. Of 1.5 per cent of total factor productivity (TFP) it contributed by between 0.1 to 0.4 per cent. Hviding and Mérette (1998) in their simulation study of seven OECD countries, show that fundamental reforms have more impact than parametric reforms. While Avitabile (2003) shows that parametric reforms increase the probability of choosing to participate in the formal sector. He also indicates that in an economy where the informal sector is a considerable size, funding implies higher steady state levels of physical capital and the formal sector only works if the quality of legal enforcement is sufficiently high. Improving the quality of institutions is costly and time consuming, but necessary to ensure the satisfactory functioning of economic structures and social security institutions in particular.

Davis (2002) found an insignificant direct effect of institutional assets (including that of pension funds) on economic growth in 16 OECD countries. However, the size of the banking sector was found to be positively linked to economic growth. Using two models (World Bank and economic growth and pension fund assets and economic growth) Hu (2004) attempted to link pension reforms, growth of pension assets and economic growth for data from 59 countries directly. Hu's results showed that pension reforms are negatively related to TFP (Total Factor Productivity) and investment in the short-run but

positively in the long-run. Davis and Hu (2004), using data from 38 countries with a modified framework of a Cobb-Douglas production function, found co-integrating relationship between pension assets, capital stock and output, with pension funds positively related to output. These outcomes will be assessed for SSA countries, where economic growth and the protection of the elderly have to be addressed. The background of the degradation of informal social security systems has to be considered (due to migration in search of better living conditions)

2.3.3 Social security and fertility

After Barro (1974) and the following developments on the role of fertility on individual consumption-saving decisions[7], the development of retirement programs is one of the most important explanations for the declining rates of fertility in developed countries since the 1950s (Becker and Barro, 1989). They investigate the impact of fertility on investment in human capital. Ehrlich and Lui (1998) argue that fertility appears to be one of the three determinants of the economic growth path.

A study by Ehrlich and Kim (2005) indicates that with the decline in fertility rates, human capital investment per child rises, raising the expected productivity per worker. This confirms findings of Becker, Murphy and Tamura (1990), that suggest that society can save across generations either by having more children (implying increased fertility), greater investment in each child (which implies lowering the number of children or fertility rates), and by the long term accumulation of physical capital[8]. In more recent growth models, human capital is seen as endogenous rather than exogenous as considered in neoclassical models like the Ramsey (1928) and Solow (1956) optimal growth models. In models where fertility is endogenised; social security affects fertility negatively (Ehrlich and Kim, 2005 and Boldrin, De Nardi and Jones, 2005).

[7] Becker and Barro (1986) developed a utility model of a dynastic family where altruistic parents maximize their utility taking into account the utility of all their dynastic family. In this model fertility has an important impact on consumption-saving decisions of parents.
[8] See also Ehrlich and Lui, 1991. Intergenerational trade, Longevity, and Economic Growth. *Journal of Political Economy*, Vol. 99: 1029-1059.

Ehrlich and Lui (1998) showed that social security financed by a PAYG system adversely affects fertility, saving and investment in human capital, even if family social security is efficient. However, Becker and Barro (1988) indicate that for given levels of fertility, benefits from social security and the taxes needed to finance these benefits, have exact offsetting effects on the wealth of a representative dynastic family, as in the Barro (1974) model. They show that a constant increase in social security benefits tends to reduce fertility temporarily even when children do not support their elderly parents. Contrarily, Boldrin, De Nardi and Jones (2005) argue that fertility does not show a tendency to revert to its previous rates. They base their conclusion on a comparative analysis of data on fertility tendencies in the US and Europe.

In sub-Saharan Africa, fertility rates are still high and comparable to those in the US and Europe in the 1940s and toward the end of the 1950s. This suggests that SSA countries may very soon enter a transition phase from high to lower fertility rates as many individuals, even in rural areas, begin to understand the costs involved in rearing children and educating them. The resultant provision of social security during and after transition may be of crucial importance. The take-off phase of economic development that many SSA countries are currently in may also contribute to lower fertility rates, as in the Ehrlich and Lui (1998) analysis. The question whether fertility rates will return to their previous levels, depends on the level of steady state fertility rates[9]. If the actual fertility rate is above the steady state fertility rate, which by assumption is equal to the steady state of the growth rate of the economy, fertility will fall with the introduction of social security. If the actual fertility rate is below the steady state fertility rate, fertility will rise with the introduction of social security[10].

Similarly, generous social security accompanied by high levels of public debt, as is the case of the majority of SSA countries, may have adverse effects on fertility, saving (unless public saving increases more than the reduction of personal saving), investment in human

[9] Fertility rates are considered as steady state when they are able to maintain a dynastic family and compatible with the steady state economic growth rates, independent of technological progress.

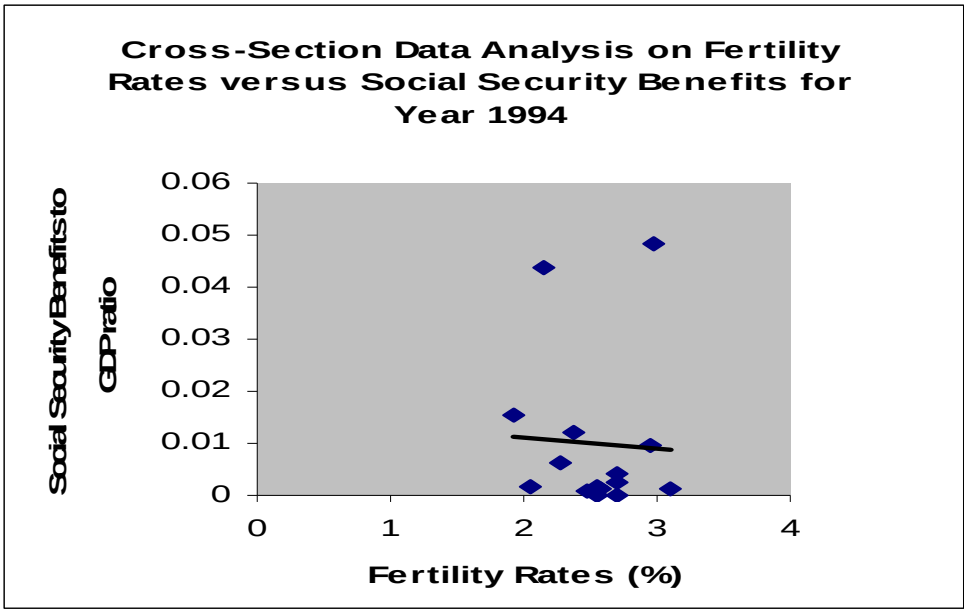
[10] This behaviour is related to the optimal levels of bequests that individuals are willing to leave to each of their children. This implies that the number of children an individual is willing to have is endogenous.

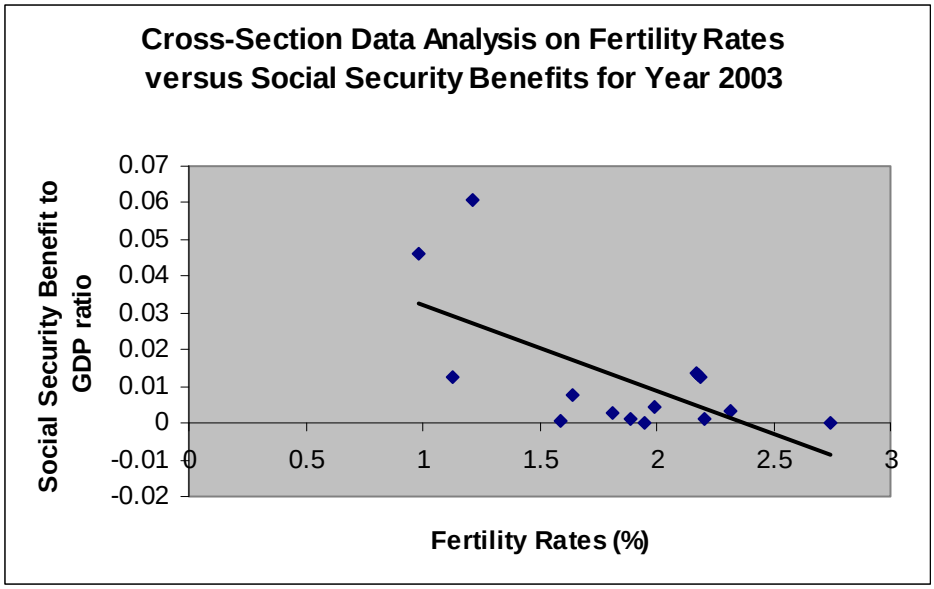
capital and economic growth. This may be the result of myopia of individuals and the literacy problem, which prevents this flow of information.

Boldrin, De Nardi and Jones (2005) found a negative relationship from 1997, between social security and fertility in a cross-sectional data analysis of 104 countries. This finding seems to be confirmed by data from 1994 to 2003 for the 14 SSA countries (Figure 3.1). The figure shows that social security and net fertility rates (measured here as gross fertility less mortality, which is equivalent to population growth) are negatively correlated, suggesting that social security reduces fertility. Therefore, as many studies have indicated (see for example Ehrlich and Lui, 1991 and 1998) low fertility rates may have a positive effect on investment in human capital. Even in the Becker and Barro (1986 and 1988) models, social security reduces fertility, though they consider it as a temporary phenomenon.

These results are similar to those found in a comparative study between the US and Europe by Boldrin, De Nardi and Jones (2005). Figure 3.1 shows that in 2003, the degree of correlation in SSA countries was higher than in 1994, supporting the finding of earlier studies, in that as social security matures, individuals tend to rely less on children for support.

Figure 5: Cross-section data analysis





Both arguments are valid for African countries where individuals tend to have children for either motive. Another important fact is that parents derive emotional fulfilment from their children. Children therefore, do not only form an extension of their parents but also fulfil a part of their parents' happiness and this offers a certain kind of social security.

In addition, Boldrin, De Nardi and Jones (2005) argue that the degree of perfection of financial markets has important effects on fertility rates. They conclude that small increases in imperfection of financial markets could cause children to be a very valuable form of investment, in other words children act as a substitute for financial markets. This is evident in SSA countries where capital markets are poorly developed. Other forms of saving for retirement (as discussed in Chapter 3) have not yet been developed to take care of aged individuals (for example due to deficiencies in the regulatory framework and/or low rates of coverage). This means fertility rates in SSA countries may actually be compatible with the findings of Boldrin, De Nardi and Jones (2005). These elements of saving will determine the way different economies react to the effects of retirement systems.

2.4 Main Insights and Concluding Remarks

Chapter 2 analysed the literature on the impact of retirement programs on economic growth, saving and fertility. The chapter started off considering that the main rationale behind providing for retirement arose from the observation that many individuals suffer during retirement. In some countries like the US the provision of retirement programs originated from the need to compensate individuals who had suffered losses during the 1930s depression and World War II.

The empirical analysis of the available literature indicates that social security crowds-out saving if bequests are non-operative as in the modified life-cycle hypothesis models of Feldstein and his predecessors. However, in models where bequests are operative as the Barro (1974) model, social security has no effect on saving. The results of investigations that followed the World Bank Report (1994) show that there are no conclusive findings on the effects of social security on saving.

On the other hand, social security is seen as having a positive impact on economic growth and a number of studies have shown that reforming social security has positive effects on per capita growth rates (Schmidt-Hebbel, 1999b). However, some other authors argue that the effects of social security on per capita growth rates depend on whether the reforms are parametric or not (Avitabile, 2003). Overall there also does not seem to be agreement on the effects of social security on per capita growth rates of the economy. The results available in the literature show that some social security stimulates per capita growth (Wigger, 1999 and Barro, 1989), while others show that it depresses it (Zhong, 1998 and Ehrlich an Kim, 2005).

In another discussion on the effects of social security, the literature indicates that social security reduces fertility rates and contributes to investment in human capital. This is the only conclusive result in terms of the effects of social security on the performance of the economy and it components. Given the results discussed in literature, it is not clear how SSA countries will react, because of low per capita income and coverage rates, high transaction costs and most importantly the underdeveloped and unstable capital markets. High fertility rates in SSA countries may reflect these structural problems.