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ABSTRACT

This paper takes into account the recent role of social protection on economic growth as a socio-economic-political stabilizer. Social protection outcome in Sudan is influenced by limited targeting actions with very low interventions between results in economic growth and accesses to basic social services. These may affects the social protection contributes to the process of development in the Sudan during the period under consideration.

The results show that more social spending increase output which enhances GDP per capita growth by 0.5% with 3.1% towards convergence equilibrium in the long run. Moreover, universal approach and expanded cover to social protection services which aim at building a social protection as a productive factor may have contributed to enhancing income security, education and health outcomes, reducing the poverty, income inequality, socio-political stability, encouraged poor productive activities and enhancing economic growth lead to sustainable development.

Key words: *Social Protection, Growth, Cointegration, causality, Sudan*

1. INTRODUCTION

There is no generally accepted definition of the social protection. It is sometimes used interchangeably with social security, social safety nets, and social assistance[1]. Sudan classified social protection under social development and included central government contributions to the pension fund and to the social security fund, social subsidies that directly benefit the poor, which are mainly directed to subsidizing electricity, free medication in emergencies only, free medicines for kidney dialysis and heart disease. In addition, direct support (with limited) to poor students in higher education and primary and secondary education, medical staff for all health units.

The challenge of universalizing socioeconomic security for the Sudanese poor and improving social protection has become a subject in the Sudan during the last three decades (1990s). Many people in the Sudan are overwhelmed by uncertainty regarding future education, health care, employment, and social security coverage households. An empirical evidences show that the crucial role of social protection for pro-poor growth, education, health and employment creation the core element in development context.

The role of social protection and economic growth has attracted recently much attention; a crucial issue in this regards is the role of social spending in helping counties foster human capital. Education, health and employment are the main dimensions of social protection and core element in development contexts; the

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[1] Mishra, S. (2008), 'Social Protection in Asia' Strategic Asia preparing for the Asian century, S.A

role of public sector to build human capital by providing and universalising the education and health services.

The main aim of this paper is to examine the impact of social protection on the Sudanese economy growth by clarify the empirical evidence about the trad-off between social protection and economic growth (in the short and long runs) and its effects on human capital components' education, and health capitals; based on assumption that social protection mechanism is not only protective factor it also productive factor, enhancing economic growth and socio-political stability for the Sudan.

This paper organised in five sections, following the introduction the second section discusses briefly the theories and empirical evidences about the effect of social protection as proxies by social expenditures on economic growth. The third section addresses the Sudan socioeconomic efforts and performance profile; the trend and perspectives of social spending in Sudan over the period (1970-2007). The fourth section describes the methodology and data used in the estimation and presents the empirical results. Finally offers some concluding remarks.

2. THEORETICAL AND LITERATURE REVIEW

There are several theories that refer to the trade-off between social protection and economic growth and do directly relate social spending with growth. The link between social protection understood as expenditure on basic social services and growth has attracted much attention recently.

There are several reasons to believe that social protection and growth may be related. One of the important arguments in this context is social assets argument "high transfer cause high growth" through institutional assurance individuals, and hence, social protection may lead to cohesion society better able to take more risks in their economic decisions because they are insured against failure through social protection system and this may foster growth[2].

A number of additional considerations suggest that social protection can be good for economic growth; Korpi [3] who have tended to highlight that greater social protection expenditure not only generates more equal and cohesive societies, but also greater economic growth. Korpi mentioned that "in a glaring contrast to the predictions of the market liberal hypothesis, the Golden Age of economic growth coincided with the extension of the welfare state, with decreasing income inequality, and with increasing political and organizational intervention into market processes"[4].

Social protection for developing countries is an important dimension in the reduction of poverty and multidimensional deprivation[5]; it aims to enhance the

[2] Ahmed et al (1991), ' Social Security in Developing Countries' Oxford University Press; Oxford
3 Korpi, W. (1985) 'Economic Growth and Welfare System Leaky Pocket or irrigation system? European Sociological Review Oxford University Press
[4] Ibid
[5] Shephred, A. et al.(2004), ' Policy paper on social protection', ODI

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capacity of poor and vulnerable people to manage socioeconomic risks, such as unemployment, exclusion, sickness, disability and old age. Policy interventions can improve their well-being by, among other things, moderating the impact of shocks causing sharp reductions in their income or consumption. Social protection can also enhance the productive capabilities of poor, reducing poverty and inequality and supports economic growth[6]. The numbers of economists have also become increasingly influenced by this argument.

Krzyszto, et al.[7] for example pointed out the importance of social protection for low income countries: through it can achieve sustainable development; moreover by provision of basic social security is an investment in country's development giving not only reduced poverty but also increased demand and expanded domestic markets, healthier, better educated, empowerment and more productive workforce as well as peace, stability and social cohesion, less conflict and politically more stable societies and hence increasing economic growth.

On the other hand, the study on promoting pro-poor through social protection recommended that the best way towards achieving pro-poor growth is social protection, in which poor participate directly, as both agents and beneficiaries, is essential directly reduces poverty through improved health outcomes, increased school attendance, hunger reduction and livelihoods promotion. Social protection can provide essential support and recurring crises expose the vulnerability of poor individuals and families as well as their jobs and livelihoods. Moreover, on going challenges of population growth, price volatility, food insecurity, highlight the need for more effective social protection[8].

An alternative set of arguments revolved around the idea of the relation between social protection and growth for example Arjona et al.[9] for example point out that if benefit system (social protection) discourage people from working, therefore, the amount of labour supplied in the economy is lowered, so reducing the level of output and the level of capital investment and hence economic growth. On the other hand if social provisions discourage people from savings then, there is a reduction in the capital available for reinvestment unless public savings rises by the equivalent amount; and they suggested that a bit more passive spending bad for growth.

Fan and Rao[10] for example analysed the public spending in developing countries, their main finding results indicated that the impact of various types of government spending on economic growth is mixed; they found that In Africa, government spending on agriculture and health was particularly strong

[6] UNDP (2006), 'Social protection the role of cash transfers'
[7] ILO (2008), 'Can Low-income Countries afford Basic Social Security?' Social Policy Briefings, Paper No 3
[8] OECD, (2009), ' promoting pro-poor growth: Social Protection'
[9] Arjona, A. et al. (2002), 'Social Protection and Growth' , Economic Studies No 35, OECD
10 Fan, S. and R., (2003) 'Public Spending in Developing Countries: Trends, Determination, and impact', EPTD

in promoting economic growth. Asia's investments in agriculture, education, and defence had positive growth-promoting effects. However, all types of government spending except health were insignificant impact on growth in Latin America.

Moreover, using panel data from 118 developing countries in 1971–2000, Emanuele and et a[111] explored the channels linking social spending, human capital, and growth and compares the effects of alternative economic policy interventions. With separated modelling for education and health capital, explicit control for governance, and incorporation of nonlinearity, they found that both education and health spending have a positive and significant impact on education and health capital, and thus support higher growth. Also, other policy interventions, such as improving governance and taming inflation, achieved similar results.

Herce et al.[12] used data for European Union (1970-1994) and panel data techniques and following production function approach they found a positive growth effect of social protection expenditure on growth. When they analysed the effects of the different categories of social protection benefits, they found a significant and positive effect for the health, old age and family programmes. In contrast, such significant effect was not found for the employment and housing programmes. Moreover, in other study by Herce et al.[13] they find that a positive correlation between welfare state and economic performance, their results points towards statistically significance Granger causality running from social protection expenditure towards growth.

Moreover, McCallun and Blais[14] find that social expenditure plays a positive role towards economic growth below a certain level and a negative one beyond it – *as long as the welfare is not too large*-; one possible interpretation of these result runs as follows: along welfare state may related economic growth by reducing the incentive to work, to save, to move, and to change. On the other hand, in a situation where special interest groups have a required significant power to block change if they so desire, the welfare state which offers assistance to those who are the victims of change may play a growth-enhancing role in reducing the incentive to block change.

An alternative evidence; for example Gwartney et al. (1998) indicate that social protection expenditure is bad for growth and social protection expenditure may trigger a trade-off between equity and efficiency and contribute to an overall loss of economic, innovative, and entrepreneurial capacity[15].

[11] Baldacci, E. And et al., (2008), 'Social Spending, Human Capital, and Growth in Developing Countries' Elsevier, WB paper 36

12 Herce, José A. Et al (1998), ' Social Protection benefits and Growth: evidence from EU, FEDA

[13] Arjona, A. et al. (2001), ' Growth and the Welfare State in the Eu: A causality analysis', Kluwer Academic

14 McCallum, J and Blais (1987),' Government, Special Interest Groups and Economic Groups' Martinus, Netherlands http://www.jstor.org/stable/30024765?seq=15

[15] Ezucrra, R. and A. (2009), 'Decentralization of Social Protection Expenditure and Economic Growth in the OECD', The Journal of Federalism, pp 1-12

In summary most of studies find that social protection can have a positive impact on growth in developing countries in a number of ways[16]. It can reduce poverty through financing investment in health and education, protecting assets that help people earn an income, encouraging risk taking, promoting participation in the labour market, and ease the pain of economic transaction.

Moreover social protection can lead to greater social integration (inclusion), political stability, human right objectives, and stable environment for individual to work, save and invest. In the other hand government must be careful to strike an appropriate balance between economic incentives and greater provision of social protection (if taxes are raised to pay for spending on social protection, tax payers may have less incentive to work and save or if government with limited revenues is not able to distribute between direct productive sectors and social sectors). Indeed government must altering the balance between apply passive (pure cash transfer of consumption) and active polices in order to encourage increased employment by the beneficences of such spending[17].

3. SUDAN'S ECONOMIC AND SOCIAL CONTEXT

3.1 GENERAL

Sudan is the largest country in Africa, officially Republic of the Sudan, 967.494 sq. mi (2.505.813 sq. km). According to the 2009 population census Sudan was inhabited by some 39 million people with annual growth rate 2.3 per year, 51% male and 49% female, 29% lived in urban areas, 68% in rural areas, and 3% were nomads; 22% of the total population lived in central states, 20% in the southern states, 18% in Western states, 13% in Khartoum states, 11% in Kordofan states, and 5% in Northern states, Sudan seems to have a young population structure. 44% of its population are under the age of 15 years[18].

3.2 THE ECONOMY

Over the period (1970-1990) Sudan's economy was characterized by low growth rates, high level of inflation, high budget deficit, deteriorating balance of payment situation, high level of unemployment and low level of investment. Sudan economic performance has undergone. It has been the trend that the growth in GDP has been cyclical, since it depends on the growth in agricultural sector. However, in the 1990s Sudan witnessed relatively high positive rate of growth in GDP with an average of 7.5% for the period 1992/07 (a recorded high of 11.3%, 10.2% in 1991and 2006 respectively)[19], growth is estimated at

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[16] DFID (2006), ' Social protection and economic growth in poor countries', practice paper number 4, Oxford
[17] Ibid
[18] Sudan in Figures and Sudan Fifth Population Results, Central Bureau of Statistics, 2010
[19] ibid

4.9% in 2009 and projected to be around 5% in 2010[20], the per capita GDP (PPP) was US$ 817 in 1970 increased to US$ 2,100 in 2007, the percentage change equal 169%.

According to the World Bank Sudan was ranked 69 and according to IMF was ranked 66 out of 226 countries in 2009 (approximately on the top of 30 per cent of the world)[21].

If Sudan sustained on average GDP growth at 10% per year; based on the rule of seventy[22], Sudan time span for doubling GDP is 7 years.

Annex 2 shows that Sudanese economy over the past four decades (1970-2007), during the first decade 1970-1979 GDP grew by 0.35 on average rates, with standard deviation of 4.6 and coefficient of variation (CV)[23] equal 12.4, during the second decade (1980-1989) GDP grew by 0.97 on average rate, with standard deviation of 4.6 and CV equal 4.7; however the trend of GDP changed in the third decade (1990-1999) by 7.12 on average rate with standard deviation and CV equal 2.9 and .41 respectively. The fourth decade (2000-2007) GDP grew by 7.54 on average rates with standard deviation equal 1.7 and CV of 0.23. Therefore, during the last decades it seems that the Sudanese economy witnessed a progress in positive direction, this trend revised the GDP per capita from US$ (PPP) 701 during (1970-79) to US$1846 in (2000-07) with annual rate of growth equal 4.1%.

The sustained growth rates of GDP for the period 2000-2007 were achieved within a context of stable macroeconomic policies and relatively controlled and carefully guided inflationary pressures[24]. In fact that the growth of the GDP was caused by supporting different factors: the Sudan designed Economic Salvation Programmes[25] extended to National Comprehensive Strategy (1990-2002) was formulated, high growth rate of agriculture with an average of 10%, rebuilding and reconstruction productive sectors, stabilise prices and sharply reduce inflation from a record high of 130.6% in 1996 to a single digit by the end of the 1990s, and later of the oil sector contribution.

3.2 POVERTY IN SUDAN

Annex 3 reports an estimated poverty head count ratio on average for Sudan over the period (1970-2003). The estimated figures showed that the average

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[20] Medani, M. (2010), 'Global Financial Crises Discussion Series; Paper 19: Sudan Phase 2', ODI

[21] http://en.wikipedia.org/wiki/List_of_countries_by_GDP_(PPP)

[22] This rule is often used to approximate the time required for a growing series to double. Let X is the initial value of a growing variable, and Y denotes the terminal value at time $t + n$. The relationship between the two is given by: $y = x(1+g)^n$; $n = \ln(2)/g$; $= 0.693147/g$; $n \approx (70/g\%)$

[23] The coefficient of variation (CV) is a normalized measure of dispersion of a probability distribution. It is defined as the ratio of the standard deviation σ to the mean μ: $CV = \sigma/\mu$

[24] Ibid 3

[25] The main objective of the reform programmes were to deal with macroeconomic instability and structural imbalances arising from 1980s, in order to lay the foundation for renewed and sustainable growth. However Sudan launched and implemented these reforms programmes under difficult circumstances characterized by seriously deteriorating relations with almost all donors, resulting in a lack of financial support for the reforms.

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poverty head count was increased from 68% in (1970- 1979) to 84% during 1990s and decreased on average to 72% during 2000s with poverty line on average equal US$ 1.5 per day[26].

The most important factors effecting spread of poverty in Sudan have been: fluctuating weather, price fluctuating with high rate of inflation, political instability caused by civil conflicts (South and Darfur) , discouraged investments, decline in agricultural production and per capita agricultural output, deteriorating health services and conditions, the high level of social and economic inequality, and the structural adjustment programmes implemented in Sudan, has resulted in dramatic increases in poverty much larger than in the absence of these programmes[27].

To improve standards of living for all Sudanese and to increase anti- poverty the following has been pursued by the government since the early of 1990s through: establishing of a social sector to develop and oversee the resources of social funds and orienting them to support the poor, retirees and students; designing of programmes to combat poverty and unemployment; introducing numerous tax relief programmes to improve living standards and to reduce the negative impacts of the economic reform policies; completing the poverty alleviation programmes; implementing emergency programmes such as the productive families programme, water supply and primary health care support; and systematic wage increases[28].

3.3 HUMAN DEVELOPMENT

Judging by Human Development Index (HDI), human development is low in Sudan. However, Sudan exercised efforts in the filed of human development during the last decade (Annex 4). The Sudan's HDI was estimated in 1975 by 0.342, in 2009, Sudan ranked 150, with HDI equal 0.531 and the human poverty index (HPI-1) equal 0.34 and the difference between HDI in 1975 and HDI in 2009 is equal to 0.189 however, this indicating a progress in human development in Sudan.[29]

3.4 SOCIAL SECTOR PERFORMANCE

3.4.1 EDUCATION

Sudan exercised vital efforts in the field of education (primary and higher) during the last two decades. The literacy rate in 1970 was estimated 25% of the population (age 15+) (41% male and 10% female) and an estimated figures in 2000 showed the literacy rate was reached to 49.9% of the population (age 15+), (50.6% male and 49.2% female)[30]. While in 1970 the literacy rate in the

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[26] Hassan, H. (2007) 'Growth and Inequality in Sudan: An Econometrics Approach' unpublished PhD U of K.

[27] 9. Ali, A.A.G., (1994) 'Structural Adjustment Programs and Poverty in Sudan' (in Arabic), Cairo: Centre for Arabic Researches.

[28] ibid

[29] UNDP (2009), 'Human Development Report' , Oxford Press

[30] CBS (2009), ' Sudan in Figures 2008'

age group 15-24 was as high as 37% (55% male and 19% female), in 2000 the estimated figures show 54.8% (57.2% male and 53.0% female).

Annex.4 shows that in 1970 the primary education enrolment was 38%, while in 2007 was 66%, with annual growth rate equal 2% per year. Annex 5 shows that the number of schools of basic education increased from 11,541 in academic year (2003/04) to 18,095 in academic year (2007/08) with percentage change equal 57% and the number of students increased from approximately 3 million in academic year (2003/04) to more than 5 million (2007/08) with an annual growth rate of 6.4% comparing with 2.7% annual growth rate in the number of teachers. This trend reveals a progressive improvement in the educational facilities and the level of literacy in the Sudan.

As regards secondary education, comparing the above mentioned academic years; annex 5 shows that the number of schools has doubling from 1723 to 3664, the number of students has also increased from 546,305 to 680,767 with an annual growth rate of 4.9% and with 1.5% annual growth rate in the number of teachers.

An expansion in higher education took place since 1990 the government was declared Higher Education Revolution, whereby Annex 6 shows that the number of students admitted annually to higher education increased by 6 folds from 55.9 thousands in 1988/1989 to 339.1 thousands in 2007/2008 with an annual high growth rate of 27%, the percentage of females in higher education increased from 38% in 1988 to 56.3% in 2008 with an annual high growth rate of 41%; in contrast the share of males was decreased from 62% in 1988 to 43.7% in 2008 with an annual growth rate of 17%. Annex 7 shows that the numbers of government universities are 29 in 2008 and private universities and colleges are 47, while the other high institution was increased from 2 in 2005 to 14 in 2008.

3.4.2 HEALTH

The health care system in Sudan is one of the oldest in Africa and had been adopted since the late 1970s[31]; provided by public and private sectors; modern health care includes the preventive, curative, and rehabilitative services. In the public sector, these services are provided by the Ministries of Health, Medical Departments of Armed Forces, Police and Security Forces, Health Insurance Organizations, and Ministry of Higher Education through its university hospitals[32].

The national report[33]stated that "the health care system in Sudan is characterized with inequality and a mal-distribution of the available health facilities and manpower between urban and rural areas and between different

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[31] WHO, (2003), ' The Health Sector in Sudan: A strategic Framework for Recovery'
[32] Ministry of Health, (2009) ' Annual Reports'
[33] ECOSOC (2003), 'Sudan's Report For THIRD United Nations Conference on the Least Developed Countries' Geneva

states. Moreover the report mentioned that the cycle of poverty, malnutrition and loss of productivity exposes the population and put it at risk of serious diseases such as malaria, Tuberculosis (TB), malnutrition, diarrhoea, and Acute Respiratory Infections (ARI)"[34].

Annex 1 shows that the estimates of fertility levels obtained from numerous censuses and surveys indicated that the trend in fertility over the last two decades has been decreasing. The crude birth rate is estimated by 47.5 births per 1000 women in 1970, and declined to 30.5 in 2007. In 1970 the total fertility rate was 6.6 children per woman and declined to 4.23 in 2007[35].

While a drop in the general mortality level was reported the crude death rate of 19.5 per 1000 in 1970 and declined to 10.9 per 1000 in 2007, this was evident by the rise in the life expectancy rate at birth (e_0) from 44 years in 1970, to 54 and 57.9 years in 2007[36].

On the other hand, Annex 11 shows that the infant mortality rate[37] (q_0) was declined from 107 per 1000 live births in 1970 to 68 per 1000 live births in 2007. Moreover, the under 5 years (q_5) mortality rate[38] declined from 168 per 1000 children in 1970 to 109 per 1000 in 2007[39] (there is no available information on these indicators based on sex) however to some extent these are indicators that the children health status in Sudan has been improved during the last years.

However, Annex 8 shows that it is evident that there has been a general upward trend in the last years (2004-2008) on the availability of personnel and facilities. For example in the years (2004-2008), the number of physicians has increased from 6887 in 2004 to 8684 in 2008 by annual growth rate 5.2%, the annual growth rate of Dentists is 12.51% the number increased from 283 in 2004 to 460 in 2008, the number of hospitals has increased by 13% and the number of hospital beds has also increased by 15%, the number of blood banks have increased significantly from 69 in 2004 to 130 in 2009 with percentage change equal 88%. On the other hand the number of dressing station has decreased by 30% and the number of primary units also decreased by 25%. Despite the expansion of the health care infrastructure in the Sudan, health facilities are still inadequate to meet the needs of the population for example a physician per 100,000 of population is only equal 20, and for specialists per 100,000 of population are only 4, Malaria is the major health problem in the country.

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[34]Ibid

[35] UN, Economic and Social Commission, Dept. of Statistics

[36] Ibid

37 Infant mortality rate is the probability of a child born in a specific year or period dying before reaching the age of one, if subject to age-specific mortality rates of that period.

38 Under-five mortality rate is the probability of a child born in a specific year or period dying before reaching the age of five, if subject to age-specific mortality rates of that period.

[39] Ibid

Inadequate access to safe drinking water and sanitation is a major influencing factor in the health of the people of the Sudan. According to the 2000 statically survey[40], about 29% have reservoir pump and 24% have piped into dwelling and of the 60% urban population and only 20% of the rural population have access to safe drinking water.

Sudan's follow up report in 2003 mentioned that "Sanitation is a relatively weak component in the water services, whereas only 5% of Khartoum's population are served by a central sewage service, compared to 20% by house-flush systems, 55% pit latrines and no proper sanitation facilities for the population living in the suburbs of the urban area, in the rural areas it cover about 20% of the rural population, using pit latrines and the majority of rural population defecate in the open and among the bushes"[41].

According to Ministry of health report in 2009[42] the introduction of health cost-recovery system and the recent adoption of the Health Area System with the introduction of federalization (decentralization of health system), will reduce rural and urban poor communities' access to health services and confounded the health problems at grassroots level.

3.5 SOCIAL PROTECTION TRENDS AND PERSPECTIVES

Based on information presented in Annex 13 for the period 1970-1989 showed that the social services spending on education and health activities, have received on average only 4 % of total current expenditures, for education sector have received on average 1.2% less than health sector on average 2%. The break-down of social services reveals that health services have received on average only 2.8 % and education on average about 1.2 % for the same period, it's clear that these ratios are very low. The running expenses of the social services show how little resources were indeed being allocated to these essential social development sectors and also indicate how small these sectors were in the government budget. Therefore, in the logic of service delivery and expenditure assignment, social protection ranked very low as government priorities in the Sudan in the period under consideration.

However, Annex 14 shows that the situation improved in the period 1990-2007, social expenditure, increased from 5% in 1990 on average to about 10% of total current spending in 2000, Annex 15 shows that the period 2005-2007 witnessed a noticeable increase in spending on social services as ratios to total expenditures reflected the government's efforts and concerns to pay attention to spending more on education and health and other social activities. This was partly in response to an ambitious plan launched by the social sectors' ministries to improve the social conditions of people. This mean that more attention and concern have been given to the social protection sectors as a

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[40] Ibid page 4
[41] ibid
[42] Ministry of Health (2009), ' 5-year Health Sector Strategy: Investing in Health and Achieving the MDGs'

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result of internal and external concerns and pressure to improve the wellbeing of the people and to allocate more resources to pro-poor sectors in the effort to reduce poverty.

Annex 16 shows that the government spending on the pro-poor sectors, namely education, health and water as ratios of GDP, but these figures are still very small. All three sectors received only 0.3% of GDP in the period 2000-2006. For instance, education expenditures are extremely low in the years (2000-2003), not exceeding 0.1%, and increased slightly to 0.3% in 2004-2006; the health sector received slightly higher ratios of GDP, amounting to 0.2 % in 2003, and 0.3 % in 2006.

It is worth mentioning here; in 1992 Sudan adopted a federal system, creating three main levels of governance; the federal, the states, and localities. The role for localities concentrated on preschool and primary education, supply and management of primary health care and environmental sanitation. The role for state government concentrated on providing secondary education and distribution of school text book to all pupils, health care at hospital and dental care units, constructions, operation and maintenance of small water schemes and agricultural development. In addition to traditional function the role of federal government; defence, foreign relations, monetary, fiscal and exchange rate policies, transportation and communication, higher education, planning and education policy, monitoring education quality and providing transfers to the poor states to finance schooling; education and posting of high-level of medical personnel; water policy and large-scale federally owned irrigation projects[43].

4. THE MODEL AND THE METHOD

The theories attempt to test empirically links between social protection and growth, in practice estimation has nearly used a simple model of the causes of economic growth and augmenting it with measures of social protection, and have used empirical model proposed by Solow and Swan (1956) with two factors: labour and capital others add human capital as a third variable of production as proposed by Romer and Weil (1992) pointed by Benank and Reft[44]. Bassanini and Scarpetta[45] determine the growth in GDP per capita modelled as a function of: investment in physical capital (more investment means more capital assets per capita, so more growth); growth rate of the population (more population growth means slower growth in income per capita, given the level of physical capital); the level of human capital (more human capital means greater efficiency in using physical capital; here we have been divided into: education capital and health capital), and income.

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[43] ibid

[44] Bernank, B. And Reft (2001), 'Is Growth Exogenous? Taking Mankiw, Romer and Weil Seriously', NBER, paper number 8365

[45] Bassanini, and Scarpetta, (2008), 'Long-Run Growth Forecasting', Springer Berlin Heidelberg

Based on the above discussion, the model to investigate the interaction of social protection on economic growth is assumed taking the following forms:

$$y_t = a_0 + \beta_1 \ln(Yc_{t-1}) + \beta_2 Se_{t-1} + \beta_3 In_t + \beta_4 Pg_t + \beta_5 Ec_t + \beta_6 Hec_t + \beta_7 Po_t + \delta_t + \varepsilon_{it}$$
$$t = 1,2,3 \qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad [1]$$

where, (Y) denotes GDP per capita economic growth in percentage; (Yc) denotes the lagged real GDP per capita (PPP$) its coefficient is expected to be negative, because it expected that the population increase at a faster rate than total income and the capital did not grow as fast ; (Se) denotes social protection proxies by the government expenditure on social services as a percentage of total expenditure, its coefficient is expected to be positive, social protection enhance economic growth through different channels; (In) denotes the investment ratio, measured in terms of gross fixed capital formation to GDP, to captures an increase in the physical capital its coefficient is expected to be positive; (Pg) denotes the annual average rate of growth of the population in percentage its coefficient is expected to be negative; (Ec) refers to the Education Capital (human capital), proxies by primary education enrolment rate, human capital promote growth its coefficient is expected to be positive; (Hec) denotes health capital and the logarithm of under-five child mortality rate is used to proxy the stock of health capital as proposed by Gyimah, Wilson and Emanuele et al[46] to facilitate interpretation, the sings of the coefficients on mortality rates are reversed so that the positive coefficients correspond to improvement in health status; (Po) denotes working age population 15-64 years of total population age structure can affect labour force and enhance growth its coefficient is expected to be positive; and (δt) refers to time dummy is used to know time shock that affect the social protection during the study period, there is incident in one year (turning point) 1992 where Sudan reform the economy by adopted liberalization and free market its coefficient is expected to be positive for the second period.

It is expected that the impact of the GDP per capita (YC), and social expenditures (SE), will be distributed over one year, which here used lagged variables. The coefficients of the model can be estimated by the Generalized Method of Moments (GMM).

The specification of above system is consistent with previous studies and it can help us for the identification of the channels through which social expenditures and other variables affect growth in Sudan. For more elaboration for the relation between social protection, human capital and growth we consider to use Granger causality as proposed by Engle and Granger (1969)[47 48], and check

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[46] ibid

[47] Engle, R.F. and C.W.J. Granger (1987), 'Cointegration and Error-Correction: Representation, Estimation, and Testing', *Econometrica 55. website:* http://www.jstor.org

48 Granger causality is a technique for determining whether one time series is useful in forecasting another. Ordinarily, regressions reflect "mere" correlations. Granger (1969) defined causality as follows: A variable Y is causal for another variable X if knowledge of the past history of Y is useful for predicting the future state of X over and above knowledge of the past history of X itself. So if the prediction of X is improved by including Y as a predictor, then Y is said to be Granger causal for X.

the stationary and if there is presence of unit root in the series, the most famous of the unit root tests are the ones derived by Dickey and Fuller and described in Fuller (1976)[49], also Augmented Dickey-Fuller (ADF) has been mostly used within a Vector autoregression (VAR)[50] model which is an econometric model used to capture the evolution and the interdependencies between variables, generalizing the univariate AR models. Sims advocates the use of VAR models as a theory-free method to estimate economic relationships, thus being an alternative to the "incredible identification restrictions" in structural models[51].

For examining the cointegartion apply (ECM) (Engle and Granger, 1987)[52] we can rewrite the long-term relationship between Y, SE and HC as follow:

$$\Delta \ln Y_t = a_{0Y} + \sum_{i=1}^{n} b_{iY} \Delta \ln Y_{t-i} + \sum_{i=1}^{n} c_{iY} \Delta \ln SE_{t-i} + \sum_{i=1}^{n} d_{iY} \Delta \ln HC_{t-i} +$$
$$\sigma_{1Y} \ln Y_{t-1} + \sigma_{2Y} \ln SE_{t-1} + \sigma_{3Y} \ln HC_{t-1} + \varepsilon_{it} \qquad [2]$$

$$\Delta \ln SE_t = a_{0SE} + \sum_{i=1}^{n} b_{iSE} \Delta \ln SE_{t-i} + \sum_{i=1}^{n} c_{SE} \Delta \ln Y_{t-i} + \sum_{i=1}^{n} d_{iSE} \Delta \ln HC_{t-i} +$$
$$\sigma_{1SE} \ln SE_{t-1} + \sigma_{2SE} \ln Y_{t-1} + \sigma_{3SE} \ln HC_{t-1} + \varepsilon_{it} \qquad [3]$$

$$\Delta \ln HC_t = a_{0HC} + \sum_{i=1}^{n} b_{iHC} \Delta \ln HC_{t-i} + \sum_{i=1}^{n} c_{iHC} \Delta \ln SE_{t-i} + \sum_{i=1}^{n} d_{iHC} \Delta \ln Y_{t-i} +$$
$$\sigma_{1HC} \ln HC_{t-1} + \sigma_{2HC} \ln SE_{t-1} + \sigma_{3HC} \ln Y_{t-1} + \varepsilon_{it} \qquad [4]$$

Here Δ is the first difference operator.

5. DATA

All variables over the period cover (1970-2007)[53] are from World Economic Development Database, World Africa Database, and UN statistics; published by IMF, WB, and UN. The data of government social expenditure as a

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Granger Causality takes into account prediction rather than the name it suggests that is causation. This is because it creates the impression that while the past can cause or predict the future, the future cannot cause or predict the past. From what Granger deduced, 'X' causes
'Y' if the past values of 'X' can be used to predict 'Y' better than the past values of 'Y' itself.

[49] Dickey, A. and W.A. Fuller (1979), 'Distribution of the Estimators for Autoregressive Time Series with a Unit Root', American Statistical Association Journal, 74, Website: http://www.jstor.org/stable/2286348?seq=2

[50] VAR model describes the evolution of a set of k variables (called **endogenous variables**) over the same sample period ($t = 1, ..., T$) as a linear function of only their past evolution. The variables are collected in a $k \times 1$ vector y_t, which has as the ith element $y_{i,t}$ the time t observation of variable y_i. For example, if the ith variable is GDP, then $y_{i,t}$ is the value of GDP at t. A (reduced) p-th order VAR, denoted VAR(p), is $y_t = c + A_1 y_{t-1} + A_2 y_{t-2} + \cdots + A_p y_{t-p} + e_t$, where c is a $k \times 1$ vector of constants (**intercept**), A_i is a $k \times k$ matrix (for every $i = 1, ..., p$) and e$_t$ is a $k \times 1$ vector of error terms satisfying $\mathrm{E}(e_t) = 0$ every error term has mean zero, $\mathrm{E}(e_t e_t') = \Omega$ the contemporaneous covariance matrix of error terms is Ω (a $n \times n$ positive definite matrix), and $\mathrm{E}(e_t e_{t-k}') = 0$ for any non-zero k there is no correlation across time; in particular, no serial correlation in individual error terms. The l-periods back observation y_{t-1} is called the l-th **lag** of y. Thus, a pth-order VAR is also called a **VAR with p lags**.

[51] Sim, C.A. (1980).' Macroeconomics and Reality', Econometrica 48: website: http://www.jstor.org/

[52] Engle, R.F. and C.W.J. Granger (1987), 'Cointegration and Error-Correction: Representation, Estimation, and Testing', *Econometrica 55. websit:* http://www.jstor.org

[53] Unfortunately, data for 2008 and 2009 are not available for most of variables used.

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percentages of current total expenditures from annul reports; Central Bank of Sudan, Ministry of Finance and National Economy (MoFNE), and Central Bureau of Statistics (CBS) Sudan; for the period 1970-1990; social services namely spending on education and health services only, while over the period 1991-2007 MoFNE classified social spending under Social Development and included central government contributions to the pension fund and to the social security fund. In addition, it includes social subsidies that directly benefit the poor, which are mainly directed to subsidizing electricity, free medication in emergencies, free medicines for kidney dialysis and heart disease, support to poor students in higher education and primary and secondary education teachers, medical staff for all health units, except specialized hospitals, and water supply employees[54].

6. EMPIRICAL ESTIMATES

6.1 SOCIAL SPENDING AND GROWTH

Table 1 and 2 present the regression results of different equations estimated to explain the effects of social spending on the growth during the period 1970-2007. In most cases the coefficients are statistically significant; all equations have tested of over-identifications using J-statists test[55]; indicated all models have a good fit.

Table 1, Column [1] presents the estimated coefficients when the equation augmented by social spending, column [2] shows the results using the same measures, exclude social spending, column [3] exclude dummy variables for economic reforms, columns [4] and [5] are exclude health capital on the ground that its insignificant and may affect the growth equation, moreover, to see whether the effect of education capital is more or less than the effect of health capital on economic growth. The augmented model presents in table 2; here we introduced the working age population instead of population growth which it appears not statistically significant for all equations.

The results show that the levels of education capital and social spending have positive effects on the Sudan's economic growth. The impact of health capital

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[54] Ibid

[55] Specification Tests in Over-identified Models An advantage of the GMM estimation in over-identified models is the ability to test the specification of the model. The J -statistic, introduced in Hansen (1982), refers to the value of the GMM objective function evaluated using an efficient GMM estimator: $J = J(\hat{\delta} (\hat{S}-1), \hat{S}-1) = ngn(\hat{\delta} (\hat{S}-1))0\hat{S}-1gn(\hat{\delta} (\hat{S}-1)) \hat{\delta} (\hat{S}-1)$ = any efficient GMM estimator $\hat{S} p \to S$ Recall, If K = L, then J = 0; if K > L, then J > 0. Under regularity conditions (see Hayashi, 2000, Chap. 3) and if the moment conditions are valid, then as $n \to \infty$ J $d\to \chi2(K - L)$ Remarks: 1. In a well-specified over-identified model with valid moment conditions the J-statistic behaves like a chi-square random variable with degrees of freedom equal to the number of over-identifying restrictions. 2. If the model is misspecified and/or some of the moment conditions do not hold (e.g., E[xitεt] = E[xit(yt − z0tδ0)] 6= 0 for some i), then the J –statistic will be large relative to a chi-square random variable with K – L degrees of freedom. 3. The J -statistic acts as an omnibus test statistic for model misspecification. A large J-statistic indicates a misspecified model. Unfortunately, the J –statistic does not, by itself, give any information about how the model is misspecified

on growth differ from that of education capital, health capital indicator negatively and insignificant affect to growth, this seems consistent with a high rate of under-five mortality in Sudan during the period under consideration. (Findings are same as in Emanuele[56]).

TABLE 1

THE EFFECTS OF SOCIAL EXPENDITURE ON GROWTH

DEPENDENT VARIABLE: GROWTH RATE OF REAL GDP PER CAPITA IN 1990 PPP

Variable	[1]	[2]	[3]	[4]	[5]
Lagged GDP Per Capita	-0.290380	-0.276770	-0.184883	-0.187704	-0.418322
	(-5.053802)**	(-4.332198)**	(-1.982567)**	(-2.879547)**	(-3.431797)**
Investment	-0.002054	-0.002869	0.009245	0.008676	0.008850
	(-0.682296)	(-0.893282)	(2.521448)**	(2.479784)**	(3.723609)**
Education Capital	0.004027	0.003099	0.001085	0.000468	0.003709
	(2.558181) **	(2.007791)**	(0.459922)	(0.196028)	(1.393497)
Health Capital	-0.336575	-0.383966	0.118659	-	-
	(-1.176686)	(-1.364175)	(0.330546)	-	-
Social Spending	0.003419	-	0.005549	0.005125	0.004256
	(2.145536)**	-	(2.787500)**	(2.371293)**	(2.409412)**
Population Growth	-5.442775	-3.599402	-7.459767	-6.033767	-9.966561
	(-1.526941)	(-1.020186)	(-1.870419)**	(-1.494830)	(-3.108151)**
Dummy (Economic Reforms 1992)	0.102681	0.125028	-	-	0.148581
	(3.030098)**	(3.168131)**	-	-	(2.974894)**
Constant	3.588282	3.747094	0.739649	1.338108	2.822005
	(2.198831)**	(2.287674)**	(0.330950)	(3.162290)**	(3.708879)**
R-Squared	0.377887	0.320100	0.459822	0.354196	0.218451
J-Statistic	0.00000	5.04E-23	0.007707	0.007598	0.066407

Source: Author's estimation
*Notes: ** t-values significant at 1% and 5% level of significance*

The results suggested that the Sudan's economic reforms adopted in 1992 have a positive effect on the growth; an economic reforms raises the growth rate by 6% in the health capital effects and about 14% for education capital effects.

The results show that the social spending in Sudan has positive affect on the economic growth, for all equations the coefficients of social spending are significance with positive sign, however, the contribution of it is very limit with small impact; an increase of social spending by 1 per cent GDP growth could increase by 0. 3 per cent, to 0.5 per cent when working age population introduced into the growth equation.

Table 2 reports that the health capital is very weak with negative impacts on growth for the Sudan; results show that the under-five mortality rate reduces growth, an increase in under five mortality rate by 1 precent is found to reduce growth by about 61 per cent, while education capital bolsters economic performance; an increase in the primary education enrolment by 1 percentage is found to increase the economic growth in Sudan by 0.8%; this result indicate that the Sudan education capital is still very weak in terms of contributions to

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[56] ibid

the economic growth. The results indicate that the working age population and investment affects growth although education and health capital does not. An increase in working age population and investment by 1% is associated with an increase in the growth of 13% and 0.6% respectively.

TABLE 2
THE EFFECTS OF SOCIAL EXPENDITURE ON GROWTH

DEPENDENT VARIABLE: GROWTH RATE OF REAL GDP PER CAPITA IN 1990 PPP

Variable	Complete Model		Effects of Health Capital		Effects of Education Capital	
Lagged GDP Per Capita	-0.598844	-0.729944	-0.168488	-0.208506	-0.097717	-0.274264
	(-2.262230)**	(-2.407183)**	(-2.801483)**	(-3.001181)**	(-3.447801)**	(-3.473797)**
Investment	0.006281	0.006996	-	-	-	-
	(2.560185)**	(2.976017)**	-	-	-	-
Education Capital	-0.002699	-0.003173	-	-	0.005051	0.008117
	(-1.378605)	(-1.144877)	-	-	(1.932254)**	(2.265591)**
Health Capital	-	-0.192548	-0.613774	-0.549722	-	-
	-	(-0.596555)	(-2.978608)**	(-2.097368)**	-	-
Social Spending	0.004201	0.004450	0.003785	0.003742	0.004707	0.003881
	(2.109429)**	(2.518237)**	(2.046165)**	(2.409149)**	(3.049699)**	(2.764642)**
Working Age Population	0.115073	0.136258	-	-	-	-
	(2.291202)**	(2.575649)**	-	-	-	-
Dummy (Economic Reforms 1992)	-	-0.009830	-	0.062261	-	0.144752
	-	(-0.210402)	-	(2.032703)**	-	(2.762207)**
Constant	-1.959259	-1.239232	4.154585	4.099107	0.432948	1.440413
	(-2.065226)**	(-0.670163)	(3.027195)**	(2.402082)**	(3.059997)**	(3.787025)**
R-Squared	0.651419	0.677044	0.294425	0.313796	0.076158	0.159342
J-Statistic	0.062310	0.061607	0.0000000	0.038999	0.046945	0.039297

Source: Author's estimation
*Notes: ** t-values significant at 1% and 5% level of significance*

6.2 GROWTH, HUMAN CAPITAL AND SOCIAL SPENDING COINTEGRATION

In the first stage, the order of integration was tested using the ADF unit root test. Table 3 reports the results of the unit root tests. The ADF statistics for the GDP per capita growth, social spending and human capital do not exceed the critical values (in absolute terms). However, when we take the first difference of each of the variables, the ADF statistics are higher than their respective critical values (in absolute terms).

Therefore, we conclude that GDP per capita growth, social spending and human capital are each integrated of order one or I(1). The next step is to test whether the stationary variables are co integrated or not.

TABLE 3
ADF UNIT ROOT TEST OF STATIONARILY

Variable	level		First Difference	
	Test Statistic	Critical Value	Test Statistic	Critical Value
Ln(Y)	-1.750779	-1.9602	-4.908774	-1.9677
Ln(Se)	-0.719753	-1.9504	-7.136805	-1.9507
Ln(Hc)	-1.911448	-2.9446	-7.075374	-2.9472

Source: Author's estimation
All the variables are stationary at their first differences and 5% level of significance

Using Johansen co-integration to test the stationary variables are cointeragted in the short run, the Eigen value at 5% show that there is one cointegratiog for GDP per capita growth, social spending and Human capital in the short run. Result of cointegrating equation show that there is positive relationship social spending and human capital and GDP per capita growth this relationship in the form:

$$\ln y = 1.412827 \ln Se + 8.977982 \ln Hc - 39.30355$$

This show that if there is 141 per cent and 898 per cent change in GDP per capita growth due to 1 per cent change in social spending and human capital respectively in the short run. These results are significant at 5% level of significance.

TABLE 4
JOHANSEN COINTEGRATION TEST

Eigen value	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.772051	32.23888	29.68	35.65	None *
0.559594	11.53799	15.41	20.04	At most 1
0.004076	0.057176	3.76	6.65	At most 2

Source: Author's estimation
*(**) denotes rejection of the hypothesis at 5%(1%) significance level   L.R. test indicates 1 cointegrating equation(s) at 5% significance level

Table 5 shows that the VEC model estimates and the results indicate that the error correction terms (ECM) in the long run of GDP per capita growth, social spending and human capital statistical significant. For the GDP per capita growth the ECM indicates 0.34 per cent speed of convergence towards equilibrium position in the case of any disequilibrium situation. The ECM shows that for social spending the convergence speed of 3.1 per cent towards equilibrium and for human capital convergence towards equilibrium point at the speed of 0.19 per cent.

THE VEC MODEL BASIC RESULTS

	D(Y)	D(SE)	D(HC)
	0.003385	**0.030537**	**-0.001907**
ECM(-1)	(0.01918)**	(0.01009)**	(0.00116)**
	(0.17649)	(3.02590)	(-1.64809)
	-0.364740	**0.143425**	**-0.009212**
C	(0.34405)	(0.18105)	(0.02075)**
	(-1.06013)	(0.79220)	(-0.44388)

Source: Author's estimation
*Notes: ** t-values significant at 1% and 5% level of significance*

Table 6 gives results on Granger causality tests. In carrying out the test of causality between GDP per capita growth, social spending and human capital the results indicate directional causality between the GDP per capita growth and social spending. This causality runs from GDP per capita growth to social spending and from social spending to human capital. We also see no causality from social spending to GDP per capita growth and from human capital to GDP per capita growth.

TABLE 6:
GRANGER CAUSALITY TEST

Null Hypothesis:	F-Statistic	Probability	Result
Social Spending Does Not Granger Cause GDP per capita growth	0.73487	0.40684	No Causality
GDP per capita Growth Does Not Granger Cause Social Spending	4.02301	0.05616**	Causality
Human Capital Does Not Granger Cause GDP per capita growth	0.10119	0.75546	No Causality
GDP per capita Growth Does Not Granger Cause Human Capital	0.70467	0.41639	No Causality
Human Capital Does Not Granger Cause Social Spending	0.05708	0.81261	No Causality
Social Spending Does Not Granger Cause Human Capital	3.97196	0.05434**	Causality

Source: Author's estimation
*Notes: ** F-values significant at 5% and 10% level of significance*

7. CONCLUSION:

In this paper we have investigated the effects of social protection benefits on economic growth for the Sudan; covering the period (1970-2007). Social protection outcome in Sudan is influenced by limited targeting actions and interventions between results in economic growth and accesses to basic social services and it's contributed to the process of socioeconomic development.

However, the results show that in the short run social spending may lead to increase the GDP per capita output, and there is evidence of positive and

significant effect of social spending on GDP per capita growth, this effect is very limited due to the different factors affecting that: the social spending received the lowest percentage ratio in relation to other items on average 2.8% for health and 1.2% for education with low levels of education and health capital, social development ranked very low as government priorities. However, the results show that the effect of social spending on GDP per capita equal on average 0.5% and an increase in primary education enrolment by 1% is associated with an increase in the growth of 0.8%, in contrast the health capital have negative and insignificant impacts.

The limited effects of social spending mentioned in the previous section appeared in the long run causality test; the causality runs from GDP per capita growth to social spending. Therefore, GDP per capita growth provides statistically significant information about future values of social spending in Sudan. Sudan must allocating more budgetary expenditures to health and education and more resources to pro-poor sectors in the efforts to let social spending as protective factor enhance GDP per capita growth in this case to causality should runs from social protection to GDP per capita growth in the long runs.

However, the causality test confirm our previous results regarding the positive role for social protection on education capital the causality runs from social spending to education capital. Social spending provides statistically significant information about future values of education capital in Sudan.

The main challenge for the Sudanese policy makers is to rethinking into social protection as not only protective factor but also as productive factors enhance economic growth. In Sudan the policy-makers define the problem too narrowly (social spending viruses economic and political problems), and it is necessary to give due consideration to the wider context of social protection as *a socio-economic-political stabilizer*. Sudan Social protection policies should aim at protect human capital include better access to hospitals, universal health insurance, improved access to schools, universal primary education, employment creation with equity, promotion of rural development for reduce socio-economic inequality, improved infrastructures, reduction of exclusion by eliminate biases against vulnerable groups (disabilities, children, poor), reforms financial sectors for access to capital, implementation of employment support projects, and first of all equal distribution of the services among the states and increase the share of social spending (gains from high rate of growth) with stabilizing macroeconomic policies, this is may be the best way for Sudan to achieve sustainable development.

The challenges of Sudan for design strategies and implementations social protection can be overcome if the normative principles retain their key positions in design and are translated into non-discriminatory with equal geographical distribution allocating and enabling implementation mechanisms. It is necessary for Sudan to avoid stigmatisation and discrimination in the

design of social protection strategies. Forms of vulnerability vary by Sudan context and social protection needs to be responsive. There is a need for specially made difference-based approaches within universalism to address vertical and horizontal forms of social exclusion.

Sudan should provision the health and education services on the area-based *Universalism* approach, combined with monitoring and evaluation of delivery, to ensure that the most vulnerable and socially excluded claim their rights and access social services the first stage focusing on education and health care. Conditionality's have mixed results – one can argue for unconditional social transfers from a rights-based position, as well as in terms of administrative costs – but there is a case for "good conditionality's" which could support behaviour change, address power relationships in the Sudanese community, and empower to claim and receive better services delivery.

Sudan should have consensus on the shift towards universalising social protection, even if progressively or gradually as institutions and economic growth gains-resources for the time being in Sudan is permit.

APPENDIXES:

ANNEX 1
SUDAN INFANT AND UNDER FIVE MORTALITY RATES PER 1,000 LIVE BIRTHS AND LIFE EXPECTANCY AT BIRTH (YEARS) (1970-2007)

Period	Infant mortality	Under5 mortality	Crude death rate	Life expectancy
1970-1975	120.8	168	17.9	47.2
1975-1980	113.5	150	16.7	48.7
1980-1985	106.5	136	15.5	50.2
1985-1990	99.1	131	14.4	51.7
1990-1995	91.2	125	13.2	53.5
1995-2000	81.1	120	12	55.3
2000-2005	73.3	115	11	56.7
2005-2007	69.1	109	10.3	58

Source: UN, Population Division database Economic and Social Commission

ANNEX 2
SUDAN GDP GROWTH AVERAGE RATE DURING FOUR DECADES (1970-2008)

Decade	1970-79	1980-89	1990-99	2000-08
Average Growth GDP	0.35	0.97	7.12	7.54
Standard Deviation	4.6	4.6	2.9	1.7
Coefficient Variation	12.4	4.7	0.41	0.23
Average GDP per capita ($ PPP)	701	852	1329	1846
Average Growth GDP per capita	-1.59	3.23	6.72	5.13

Source: calculated based on the Annex (23)

ANNEX 3
ESTIMATED POVERTY HEAD COUNT RATIO, INEQUALITY AND POVERTY LINE (1970-2003)

	Gini	Poverty H%	P_{Line} per day US$
1970-1974	32.64	67.76	1.43
1975-1979	43.91	67.66	1.95
1980-1984	45.44	71.25	1.81
1985-1989	46.68	73.85	1.74
1990-1994	43.79	84.06	1.18
1995-1999	42.22	72.42	1.60
2000-2003	45.10	71.84	1.56

Source: Annex VII[57] * inequality measure

ANNEX 4
SUDAN HDI TRENDS (1975-2009)

	1975	1980	1985	1990	2000	2005	2009
SUDAN HDI	0.342	0.368	0.390	0.406	0.490	0.515	0.531
PERCENTAGE CHANGE IN HDI BASE YEAR 1975	0	8	14	19	43	51	55

Source: UNDP, Human Development Report, statistical appendixes

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[57] Hassan, H. (2007), 'Growth and Inequality in Sudan: An Econometrics Approach' unpublished PhD U of K

ANNEX5:
BASIC AND SECONDARY EDUCATION IN SUDAN (2003/04 – 2007/08)

Year	Basic Level			Secondary Level		
	No. of Students	No. of Schools	No. of Teachers	No. of Students	No. of Schools	No. of Teachers
2003/2004	3966944	11541	136401	546305	1723	24280
2004/2005	4299737	14071	141315	637812	2382	34060
2005/2006	4624302	16729	143327	639827	2459	35994
2006/2007	4785952	15907	145999	636156	3402	40966
2007/2008	5253117	18095	155023	680767	3664	42128

Source: Ministry of General Education

ANNEX 6:
NUMBER OF STUDENTS HIGH EDUCATION 2004/2005 – 2007/2008

	1988/1989	2000/2001	2001/2002	2002/2003	2007/2008
Male	34708	75992	106954	96669	148040
Female	21285	84528	117988	106286	191085
Total	**55993**	**160520**	**224942**	**202955**	**339125**
Male (%)	62.0	47.3	47.5	47.6	43.7
Female (%)	38.0	52.7	52.5	52.4	56.3
Total (%)	**100**	**100**	**100**	**100**	**100**

Source: Ministry of Higher Education, selected from different Appendixes

ANNEX 7:
HIGH EDUCATION INSTITUTIONS 2004/2005 – 2007/2008

	2004/2005	2005/2006	2006/2007	2007/2008
Government Universities	27	27	29	**29**
Private Universities & Colleges	46	46	46	**47**
Other High Education Institutions	2	3	3	**14***

Source: Ministry of Higher Education
Notes *Colleges and institutes not affiliated with universities

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Specification No. Of:	2004	2005	2006	2007	2008
Hospitals	351	357	375	380	**395**
Hospital Beds	24785	26094	26577	27438	**28389**
Health Centres	1009	1043	1202	1397	**1398**
Dispensaries	1423	1226	1385	1224	**2280**
Dressing Stations	771	762	935	701	**542**
Primary H. C. Units	2679	3044	2592	2744	**2005**
Physicians	*6887	*8008	**8799	**9573	***8684**
Dentists	283	371	352	512	**460**
Pharmacists	697	894	1004	756	**797**
Medical Assistants	6746	5945	7184	7107	**7935**
Nurses	16826	17923	18428	18083	**18651**
X-Ray Units	111	144	166	164	**165**
Blood Banks	69	93	122	137	**130**
Hospitals per 100,000 of population	1	1	1	1	**1**
Beds per 100,000 of population	72	73.7	73.2	73.8	**72.5**
Physicians per 100,000 of population	20	22.6	28.6	29.9	**22.1**
specialists per 100,000 of population	3.3	3.6	4.5	4.6	**4.4**
Dentists per 100,000 of population	0.8	1	1.1	1.6	**1.2**
Pharmacists per 100,000 of population	2	2.5	3.2	1.9	**2**

Source: Ministry of Health
*Notes: *Physicians in Ministry of Health, Universities & elsewhere, excluding Physicians in Private sector, it consists of: Specialists, Registrars, General, Housemen and Dentists. **: Physicians in Ministry of Health, Universities & elsewhere, excluding Physicians in Private sector, it consist of: Specialists, Registrars, General and Housemen.*

Specification	Percentage Change 2004-2008	Specification	Annual Rate of Growth 2004-2008
Hospitals	12.54	**Physicians**	5.22
Hospital Beds	14.54	**Dentists**	12.51
Health Centres	38.55	**Pharmacists**	2.87
Dispensaries	60.22	**Medical Assistants**	3.53
Dressing Stations	-29.70	**Nurses**	2.17
Primary H. C. Units	-25.16	**Physicians per 100,000 of population**	2.10
X-Ray Units	48.65	**specialists per 100,000 of population**	6.67
Blood Banks	88.41	**Dentists per 100,000 of population**	10.00
Hospitals per 100,000 of population	0.00	**Pharmacists per 100,000 of population**	0.00
Beds per 100,000 of population	0.69		

Source: Calculated based on Annex (8)

ANNEX 10:
LABOUR FORCE BY ECONOMIC SECTOR (%)

Sector	Total	Urban	Rural	Male	Female
Agriculture	52.1	5.0	75.0	46.6	67.2
Industry	6.9	13.3	3.7	8.1	3.4
Services	39.3	79.1	20.0	43.5	27.6

Source: Ministry of Manpower, Migration and Labour Force Survey 1996

ANNEX 11:
MANPOWER AND UNEMPLOYMENT IN SUDAN 2000

Age Group	Proportion of total Population	Rate of participation in economic activity	Unemployment Rate %
24-15	20.6	36	28.4
59-25	29.4	62	10.3
64-60	3.4	6	12.1
+65	2.7	49	11.4
Total	56.1	52	15.1

Source: Ministry of Labour and Administrative Reform

ANNEX 12:
GROWTH OF THE LABOUR FORCE 1990-1996 (% PER YEAR)

Labour Force	Total	Urban	Rural
Total	4.9	7.4	4.2
Male	3.7	6.3	3.0
Female	7.8	11.6	6.8

Source: Ministry of Manpower, Migration and Labour Force Survey 1996

ANNEX 13:
SOCIAL GOVERNMENT EXPENDITURE (1979-1989) IN MILLION OF SUDANESE POUND SDD

Year	Social Services SDD	Social Services % of Total	Education SDD	Education % of Total	Health SDD	Health % of Total	Total Spending
1979	36.1	5.4	9.1	1.4	12.1	1.8	659.1
1980	36	4.4	9.4	1.1	12.9	1.6	820.3
1981	37.5	3.9	10.5	1.1	13.4	1.4	942.6
1982	53.7	5.2	14.9	1.4	21.2	2	1042
1983	59.7	4.4	20.7	1.5	30.4	2.2	1368.1
1984	66.7	3.8	22.9	1.3	34.6	1.9	1757.2
1985	34.9	1.8	15.7	0.8	9.6	0.5	1912.9
1986	33.1	1	15.6	0.5	9.3	0.3	3237
1987	217	5.1	52.7	1.2	144.3	3.4	4259.7
1988	264.8	5.1	69.4	1.3	169.3	3.2	5232.2
1989	311.6	4.2	84.9	1.1	193.9	2.6	7385.8

Source: MoFNE

ANNEX14:
SOCIAL GOVERNMENT EXPENDITURE (1990-2006)

Year	Social Expenditure	Social Expenditure % of total Exp.	Total Current Expenditure
1990	0.078	5%	1.586
1991	0.108	2%	5.344
1992	0.354	4%	7.967
1993	0.75	6%	11.94
1994	10.4	38%	27.67
1996	20.6	25%	83
1997	3.32	3%	124.36
1998	23.2	15%	157.5
1999	32.8	17%	197.5
2000	32.4	10%	312.5

Source: MoFNE

ANNEX15:
SOCIAL GOVERNMENT EXPENDITURE (2001-2008)

Year	Social Expenditure	Social Exp. % of Current Exp	Social Exp. % of Total Exp	Development Expend.	Others	Current Expenditure	Total Expenditure
2001	16	4.71	3.83	78	62	340	418
2002	28	7.43	5.41	141	113	377	518
2003	35	7.07	5.21	177	142	495	672
2004	46	8.85	6.13	230	184	520	750
2005	58	9.67	6.52	290	232	600	890
2006	67	9.44	6.41	336	269	710	1046
2007	76	9.22	6.31	380	304	824	1204
2008	84	9.33	6.36	420	336	900	1320

Source: ibid Annex 8. Sudan: Estimated Evolution of Central Government Operations 2001 -2010, in BSD

ANNEX16:
SOCIAL GOVERNMENT EXPENDITURE AND GDP (2000-2006)

	2000	2001	2002	2003	2004	2005	2006
Education	1.4	1.7	2.1	1.9	14.5	17.8	21.3
Health	5.4	7.1	8.5	9.8	16.8	17.9	19.9
Water	0.2	0.9	0.2	5.1	10.2	15.2	20.2
Education as % GDP	0	0.1	0.1	0	0.3	0.3	0.3
Health as % GDP	0.2	0.2	0.2	0.2	0.3	0.3	0.3
Water as % GDP	0	0	0	0.1	0.2	0.3	0.3
Total Spending as % GDP	11.5	11.9	13	16.2	19.9	17.6	15.6
Social Spending as % GDP	0.2	0.3	0.3	0.4	0.8	0.9	1
Current Spending as % GDP	0.2	0.2	0.2	0.2	0.3	0.3	0.3
Development Spending as % GDP	0.1	0.1	0.1	0.2	0.6	0.6	0.7

Source: MoFNE

ANNEX 17
LIST OF VARIABLES

Year	GDP per capita $ PPP	GDP per Capita Growth	Social Spending	Investment	POPG	POP15	Primary Education Enrolment	Under Five Mortality Rate
1970	817	--	4.00	12.67	2.91	52.84	38.00	168
1971	859	5.14	4.10	10.42	3.02	52.74	44.00	164
1972	801	-6.75	4.23	10.50	3.09	52.64	44.00	160
1973	705	-11.99	3.70	15.61	3.15	52.55	44.00	157
1974	712	0.99	3.80	17.93	3.17	52.47	44.00	154
1975	535	-24.86	4.40	20.64	3.18	52.39	47.00	150
1976	615	14.95	3.70	19.75	3.19	52.33	48.00	147
1977	654	6.34	3.70	15.57	3.21	52.28	49.00	145
1978	644	-1.53	3.20	13.77	3.26	52.25	50.00	143
1979	666	3.42	5.40	14.24	3.31	52.23	50.10	142
1980	734	10.21	4.40	14.66	3.38	52.23	49.90	136
1981	810	10.35	3.90	19.31	3.41	52.24	50.50	135
1982	849	4.81	5.20	18.86	3.34	52.26	50.90	135
1983	802	-5.54	4.40	14.75	3.15	52.31	50.20	134
1984	794	-1.00	3.80	8.54	2.90	52.40	50.50	131
1985	807	1.64	1.80	9.49	2.62	52.52	51.60	131
1986	868	7.56	1.00	14.37	2.41	52.69	51.00	130
1987	916	5.53	5.10	15.09	2.29	52.89	44.00	129
1988	969	5.79	5.10	11.00	2.31	53.12	44.00	128
1989	967	-0.21	4.20	10.00	2.41	53.36	44.00	127
1990	953	-1.45	5.00	11.00	2.54	53.62	57.30	125
1991	1027	7.76	2.80	9.00	2.62	53.87	54.30	125
1992	1103	7.40	4.00	11.00	2.67	54.13	41.50	124
1993	1143	3.63	6.00	8.00	2.67	54.39	42.20	123
1994	1192	4.29	6.28	9.00	2.64	54.65	52.50	122
1995	1509	26.59	37.38	7.00	2.62	54.92	50.10	120
1996	1545	2.39	24.82	21.54	2.60	55.18	50.90	119
1997	1628	5.37	2.65	20.36	2.54	55.45	51.20	118
1998	1640	0.74	14.73	17.02	2.44	55.71	45.50	117
1999	1550	-5.49	16.61	16.30	2.32	55.95	47.10	115
2000	1683	8.58	10.37	17.86	2.19	56.18	51.00	115
2001	1654	-1.72	10.62	17.57	2.07	56.38	57.30	114
2002	1820	10.04	8.67	18.25	2.02	56.57	58.00	113
2003	1910	4.95	3.69	18.16	2.04	56.75	59.60	112
2004	1949	2.04	3.41	19.98	2.11	56.94	62.00	111
2005	2083	6.88	3.13	20.21	2.19	56.94	64.00	110
2006	2085	0.10	9.44	20.46	2.24	56.94	65.24	110
2007	2086	0.05	9.22	20.79	2.83	60.00	65.70	109

Source: WB, IMF UN Statists Dept., and MoFNE

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