



Population–Poverty–Inequality Nexus and Social Protection in Africa

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Abstract

This study examines how social protection policies and programmes can help in poverty and inequality reduction in Africa. The study covers 38 African countries and engages the fixed and random effects models utilising data sourced from the World Development Indicators, Gini Index and Country Policy Institutional Assessment for the period 2000–2017. A remarkable finding, *among other things*, from the study is that a 1% increase in the provision of social protection will decrease poverty and inequality by 58% and 26%, respectively. The results imply that the provision of social protection contributes to poverty and inequality reduction in Africa. Therefore, the study recommends that the efficient provision of social protection should be implemented through in-kind and in-cash supports, among others, in order to reduce the level of poverty and inequality in Africa. Although, social protection appears to be an essential strategy for reducing, to a more considerable extent, poverty and, to a relatively lesser extent, inequality in Africa, there are also regional variations. Thus, the study submits that the type (s) of social protection policies may need to differ from one region to the other.

Keywords Gini Index · Governance · Inequality · Institutional framework · Poverty reduction · Social protection

JEL Classification D63 · I14 · I31 · O43

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1 Introduction

While the global rate of poverty has declined by more than half since 2000; two in ten people in Africa are still living on less than the international poverty line of US\$1.25 per day (Fiszbein et al. 2014; Bakhshinyan et al. 2019; Osabohien et al. 2018a, b). Though, significant progress has been made in many countries within Eastern and South-eastern Asia, up to 42% of the population in African countries are still living below the poverty line (Matthew et al. 2019a; Azuh et al. 2016). It has been argued that the high poverty rate in Africa is caused majorly by increased level of unemployment (Matthew et al. 2020).

There should be a sustainable increase in the level of employment through the provision of adequate social protection policies and programmes to control the issues of poverty and inequality in Africa (Matthew et al. 2019a, b; Osabohien et al. 2019a, b, c). Employment sustainability and promotion of equality should be associated with economic growth; because, when people are employed, there will be an improvement in welfare and the overall economic growth (United Nations Development Programme UNDP 2006). Besides, the implementation of social protection programmes and policies is essential to cushioning the effects of economic risks and disasters. These risks and disasters include low agricultural output, low income, high unemployment rate, drought, which can result in famine amongst others. When these economic risks and disasters are controlled, the poverty level will be reduced, and thus, economic growth will be boosted (Igharo et al. 2020; Bakhshinyan et al. 2019; Osabohien et al. 2019b; Gentilini and Omamo 2011).

The human population may seem to be an environment enclosed with individuals which the growth of its population changes over time (Li and Zhang 2010). The world population as at 2017 was about 7.3 billion, with China having a total population of 1372 million, followed by India (1314 million), United States of America (321 million), Indonesia (256 million), Brazil (205 million), Pakistan (199 million), and Nigeria occupied the seventh position with a total population of 189 million. The projected population by 2050 puts India as first, with 1660 million persons, followed by China (1366) million, United States (398 million), and Nigeria (397 million) being the fourth (UNDESA POP DIV 2017; Matthew et al. 2019b).

Pison (2017) posited that with a rapid increase in the population in Africa, which increased to 140 and 750 million as of 1900 and 2000, respectively and further increased to a billion people in 2010. According to the United Nations “medium scenario” projections, this figure will rise to more than 2.5 billion in 2050 and more than 4.39 billion in 2100. The value represents 39% of the world’s population by 2100, as against 16% in 2015. Similarly, as regards the inequality rate in Africa, a study by Aigbokhan (2000) showed increased levels of inequality and poverty using nationwide surveys for 1985/86, 1992/93 and 1996/97 with the inequality level ranging between 22% in 1985/86, 23.5% in 1992/93 and rising to 25% in 1996/97 in Africa. However, the inequality level is said to have worsened, with the average rates being 28%, 30%, 31% and 33% in 2000, 2005, 2010 and 2015 respectively in Africa (Matthew et al. 2020). The high population figures, in conjunction with the poor economic performance account for why there is a high level of poverty, inequality, increasing rate of crime, usually witnessed in most developing countries, including Africa. Therefore, if practical efforts are not made to curb the growth of the population in Africa, there will be a high rate of inequality and poverty in Africa (Azuh et al. 2016, 2017).

The need to address extreme poverty, rising inequality, as well as risk and vulnerability, has led to an expansion of a set of instruments broadly classified as social protection. By social protection, we mean a collection of programmes and policies that address risk,

vulnerability, inequality, and poverty through a system of transfers in cash or in-kind. The last decade has seen an expansion of social protection in the number of African countries (e.g. Liberia, Ethiopia, Madagascar, Guinea, Benin, Uganda) that have established relatively cash transfer programmes to enhance rural livelihood (Hanlon et al. 2010; Fiszbein et al. 2014). Thus, it is argued that social protection is one of the strategies to reduce poverty and inequality in Africa.

It is against this background that this study investigates how the provision of social protection programmes can play a role in the reduction of inequality and poverty in Africa. This research objective is germane as it is in line with Goal 1 (‘No Poverty’) and Goal 10 (‘Reducing Inequality’) of the Sustainable Development Goals (SDGs) that was adopted by the United Nations at its 70th Session on 25th September 2015 (United Nations 2015). The remaining parts of the study are organised in sections as follows: the next section contains brief insights from the related literature and the theoretical framework. The third section presents the methodology; section four entails the econometric analysis and discussion, while section five concludes the study.

2 Literature Review and Theoretical Framework

2.1 Social Protection Conceptualised

Social protection is conceptualised as a measure taken towards access to health care and income security which can be relatively guaranteed in cash and in-kind (Fiszbein et al. 2014; Osabohien et al. 2018a, b). Fonteneau and Ongevalle (2015) defined it as a control on the reduction of income (caused by various contingencies), which prevents the society against economic and social distress. Labour market intervention is also a driving force of social protection, as it targets toward a coherent labour market effectiveness, vulnerability and poverty reduction, employment promotion and protection. Miguel (2018) opined labour markets are contributory strategies for job search enhancement which serves as a likelihood policy of return to work when linked to income support policies. Also, social protection is a means to facilitate human well-being and avert vulnerability and poverty (ILO/UNDP 1996; Osabohien et al. 2019a, b, c).

The study by Osabohien et al. (2019a, b, c) found that the provision of social protection programmes increased households’ productivity by 3%. The authors concluded that the government of West African countries should efficiently provision of social incentives like health care and scholarship for individuals, especially, those in rural communities to reduce the incidence of poverty and inequality. In effects, social protection system helps towards averting old age or death of a family member, employment injury, unemployment, general poverty and social exclusion, maternity, sickness causing lack of work-related income, disability. It also promotes access to primary health care and family support, which, in particular deals with children and adult dependents (ILO 2014).

2.2 Key Theoretical Perspectives on Social Protection

Some theories have emerged on the analysis of poverty and government intervention in the form of social welfare. However, few theories have been confined to the understanding of social protection policies and inequality, especially for rural communities. However, this study has examined in summary; the Classical and the Neo-classical views, the Keynesian

and Marxian views, including the social exclusion theory leading to the livelihood portfolio theory proposed by de Neubourg (2009). Social exclusion and the livelihood portfolio theories seem to match our discussion and analysis on the provision of social protection services to curb poverty and inequality.

From the Classical point of view, individuals are assumed to work their way out of poverty and inequality; hence, no form of social assistance is recommended for poverty alleviation. Poverty is considered inherent and assumes that one can only escape through hard work (Osabohien et al. 2020). The weakness of this school of thought is that it neglects the importance of labour, considers profit as cheating and overlooks the intricate process of production. Nevertheless, classical strength recognises that full employment is achieved without the need for government intervention, thereby intruding a *laissez-faire* system. In this case, it is difficult for the government to provide support to cushion the effect of poverty. However, under the neoclassical expression, poverty is more of economic and social deprivation occasioned by market imperfections that exclude the poor from available social welfare and lack of a fair share in the distribution of economic resources (Osabohien et al. 2020; Bradshaw 2007).

The Keynesians believe that poverty in a society is driven by the lack of public goods and inequality in the distribution of available resources. To this end, a good measure should be controlled by the state, and the distribution should be even, irrespective of social stratification (Osabohien et al. 2020; Bradshaw 2007). For instance, human capital development such as education and health provisions should be the obligation of government and individuals should be guaranteed the opportunity to harness such rights in equal proportion. On the contrary, the neo-Keynesians also argued that there should be an overall growth in human development to uplift the individual from poverty (De Haas 2010). This can only be achieved through government intervention to reduce the negative influence of macroeconomic factors such as inflation, exchange rate and unemployment on the economic well-being of the populace (Osabohien 2018). The weakness of this school of thought is that the government cannot provide all that is needed for the populace especially in Africa where the countries are underdeveloped, the poverty rate is high, and the population is on the increase. The strength of the Keynesian school of thought lies in the fact that the rate at which the private section will exploit the people will reduce.

A more radical dimension was taken by the Marxian economists espousing that economic growth alone may not possibly lift the poor especially peasant farmers out of poverty, because of class struggle in the capitalist system where the factors of production are controlled by the rich (Osabohien et al. 2019a, b, c; Shildrick and Rucell 2015). They would rather prefer mainstream economic stability, which includes both economic and environmental improvements, because the poor are most vulnerable to environmental disasters, especially in farming (Osabohien et al. 2019a, b, c). The weakness of the school of thought is the reduction of labour and increment in unemployment as a result of technological progress. In contrast, the strength of the Marxian school of thought stems from a complete uniformity and full co-operation among the Marxians which considers international struggle as a part of a struggle-start in one country.

The social exclusion theorists were the most fundamental in recognition of structural changes in society. The inadequacy of social capital was understandably the challenge of this school of thought. Nevertheless, they streamlined the definition of poverty to those unable to receive social benefits (Asongu et al. 2019; Shildrick and Rucell 2015; De Haas 2010; Bradshaw 2007). The weakness of this school of thought is the much emphasis paid on the environment when there is an adverse shock on the environment it will affect virtually everyone in the country. However, the strength of this theory lies in the fact that it

focused on those living in the rural areas rather than the urban areas because the significant population of farmers are in the rural areas (Osabohien et al. 2020).

The development of the social exclusion theory leads to what de Neubourg (2009) referred to as the livelihood portfolio theory, where institutions—family, markets, social networks, member institutions, and public authorities are believed to be the core driving force of social protection for the household. Under the livelihood portfolio theory, de Neubourg (2009) using the welfare pentagon expressed the interaction between social agents in the determination of household welfare, given certain underlying assumptions of utility maximisation and income constraints, occasioned by consumption risks. Public authorities mitigate these consumption risks through social security benefits and agricultural subsidies for farming communities or individuals relying on family or communal support to compensate for a shock (Osabohien et al. 2020).

2.3 Population, Poverty and Inequality Nexus in Africa

Human population growth has been identified as an underlying environmental problem in Africa (Iwejingi 2011). It was also observed by Iwejingi (2011) that rapid population growth in Africa and many other developing countries result from the interplay of many factors. These include; the inability to convince people who agitate for a controlled birth rate, the global system or, the vigorous efforts made to disabuse the minds of those who are against controlling the birth rate. The resultant effect is the populace depending on science and technology for food production, and other human needs.

Asthana and Asthana (2006) opined that the impact of human beings on the environment is through the reduction in ecosystem complexity, diversity and changes in biogeochemical cycles. In a similar study, Theodore (2006) stated that the effects of population growth on living standards, resources use, and environment would continue to be a problem unless it is put on check. These checks include; family planning, empowering women to reduce their rate of fertility, encouraging late marriages amongst other checks. The high population growth rate is also closely associated with ignorance, illiteracy and traditional socio-cultural practices. Some of them include having a large number of children with the notion of using them for agricultural activities, the refusal and inability to use contraceptives for family planning which is regarded as forbidden amongst other practices; are still predominant in Africa (Agbodike 2011).

The consequence of population growth on economic growth is more unfavourable in developing countries because of greater resource-waste and resource-digression effects, as well as the weaker policy on the environment (Beecroft et al. 2020; Bakhshinyan et al. 2019; Headey and Hodge 2009). Population growth can sturdily be affected by the influence of investment. Higgins (1998) opined that at the age of 15–25 years, a more significant portion of influence on investment is relatively high on population and high savings is actualised between 30 and 45 years. Inequality, which is generally defined as the proportion of and gaps between, the rich and the poor, can exist and contribute to poverty in a range of dimensions and is often measured in monetary terms (that is, income).

Inequality also has a non-monetary dimension (non-income) such as health, nutrition, education and access to essential services. Inequality was one of the central topics of the World Summit for social development in 1995 (Danquah and Ohemeng 2015). Resolution 62/213 of 7 March 2008 of the United Nations General Assembly recognised that inequality within and among countries is a concern for all countries regardless of their levels of development. It represents a growing challenge with multiple implications for the

realisation of economic and social potentials and the achievement of internationally agreed goals, including SDGs. The World Bank has adopted two new metrics for fighting global poverty and inequality. Specifically, this goal is to be reached by ending extreme levels of poverty and promoting what the World Bank termed “shared prosperity”. Ending extreme poverty has been defined as reducing “the percentage of people living with less than \$1.25 a day to no more than 3% globally by 2030”. In contrast, promoting shared prosperity is defined as “fostering income growth of the bottom 40% of the population in every country” (World Bank 2013; Fan et al. 2015).

It is imperative to examine the relationship between population growth, poverty and inequality in Africa through the intervention of social protection. Evidence shows that, while not necessarily being the first-order objective, social protection can potentially promote growth in two ways viz; the first one revolves around the accumulation of human capital. When there is an increase in population, there will be an improvement in the growth of human capital (Alderman 2011; Behrman et al. 2004). For example, in Ethiopia, Yamano et al. (2005) found that children in drought-affected communities receiving food transfers grew taller than those in non-receiving areas—an important factor, as stunting can be closely correlated to future earnings (Strauss and Thomas 1998). In Guatemala, it is estimated that nutrition interventions in early childhood led to higher wages in the order of 46% as adults compared to non-recipients (Woldehanna et al. 2008). In Zimbabwe, lifetime earnings of children affected by droughts in the 1980s were reduced by an average of 14% (Alderman and Haque 2006).

Secondly, social protection feeds into broader research exploring the interplay among inequality, poverty reduction and population growth. Research evidence reveals that some trade-offs exist between inequality and growth may be less pronounced than often perceived (Ravallion 2009a). In some countries such as Brazil, evidence shows that redistributive policies have played a key role in reducing poverty by complementing the growth and market-oriented policies (Ravallion 2009b). In other contexts, such as China; however, the role of redistribution in fostering growth seemed more limited (Dollar 2009; Ravallion 2009c).

2.4 Building a Case for Social Protection in Africa

Social protection can help reduce and mitigate the risk of drought and disasters and to ensure long-term development. It also ensures equity in all sections of society (Tekla et al. 2019). Social protection is believed to be essential in Africa in order to: (1) expand social support for reform programmes; (2) encourage social justice and equity—and make growth more resourceful and fair; (3) offer protection for all citizens against risk (including financial crises); (4) guarantee basic satisfactory living standards for all; (5) make possible investment in human capital for poor households and communities; (6) encourage social unity and social harmony (social stability); (7) make sure that there is stability of access for all to the basic services necessary for developing human capital, and (8) ensure that essential needs are met (Norton et al. 2001). Thus, one major way the governments of African countries can reduce poverty and inequality is through the provision of social protection to farmers. It will help take care of their welfare that will, in turn, increase agricultural productivity. Hence, this study aims to contribute to knowledge by examining how social protection programmes can be used to reduce poverty and inequality in the face of the fast-growing population in Africa. To the best of the knowledge of the authors, there is a dearth of empirical studies that examine the interaction of population, poverty, and inequality

using social protection mechanisms as means of bridging the gap in Africa. Thus, this study contributes to knowledge by filling this observed gap.

3 Methodology

3.1 Measurement of Variables

Data for this study was sourced from the World Bank three primary databases- World Development Indicators (WDI), International Country Risk Guide (ICRG) and the Country Policy and Institutional Assessment (CPIA). Data for poverty and inequality are sourced from the ICRG, employment; Gross Domestic Products (GDP) growth and population are sourced from the WDI, while social protection variables are from the CPIA. The CPIA for Africa explains the rate at which African countries are progressing in terms of strengthening the quality of their policies and institutions capable of creating employment, reduce poverty and inequality among the most vulnerable. CPIA data is on a scale of 1 (lowest) to 6 (highest)—for all countries listed in the World Bank International Development Association. Thus, the variables used in the study are briefly explained herewith.

Poverty (POV) means the situation where an individual or a household does not have the required resources to maintain a minimum living standard (Matthew et al. 2019a, b). Also, it may be referred to as a condition whereby the level of income from employment is low to meet the basic needs. Poverty in this study was measured by poverty headcount at US\$1.25 2005 Purchasing Power Parity (PPP). Poverty was sourced from ICRG, measures in percentage on a scale of 0% to 100% (the closer to zero, the lower the level of poverty, and the closer to 100, the higher the level of poverty).

Inequality (INEQ) measures the extreme disparity in the distribution of income with a more concentration of income usually in the hands of a small percentage of the population. When income inequality occurs, there is a large gap between the wealth of one population segment compared to another. Inequality was measured using Gini coefficient. The Gini coefficient is the most commonly recognised measure of inequality because it abridges the entire income distribution for a country on a scale of 0 to 1; the higher the number, the higher the degree of inequality (Adeleye 2018). Data for inequality was sourced from ICRG.

Building Human Resources (BHR) assess the national policies and public and private sector service delivery that affect the access to and quality of household health and educational services, including prevention and treatment of diseases such as tuberculosis and malaria. The data for Building human resource was sourced from CPIA, measures on a scale of 1 to 6 (1 = low, 6 = high), the higher, the better.

Equity in the use of public Resource (EPR) assesses the extent to which the pattern of public expenditures and revenue collection affects the poor and is consistent with employment creation and national poverty reduction priorities. Data for equity in the use of the public resources were sourced from CPIA, measures on a scale of 1 (lowest) to 6 (highest), the higher, the better.

Policy for social inclusion and equity (PFSIE) includes gender equality, equity of public resource use, building human resources, social protection, labour, policies and institutions for environmental sustainability. Data for policy for inclusion and equity was sourced from CPIA, measures on a scale of 1 (lowest) to 6 (highest), the higher, the better.

Social Protection Ratings (SOPR) captures government policies in social protection and labour market regulations that reduce the risk of becoming poor, assist those who are poor to manage further risks better and ensure a better level of welfare to all people. Data for social protection rating was sourced from CPIA, measures on a scale of 1 (lowest) to 6 (highest), the higher, the better. Concerning social protection, the score for social protection ranges from 1 to 6, a score of 1 means that society is weakly or not adequately protected. In comparison, a score of 6 means that the society is well or strongly protected. In contrast, a score between 4 and 5 may be said to be a moderate or partial social protection, as seen in the empirical work of Osabohien et al. (2018a, b).

Total Population (POPT) means the total number of people living in a country. Data for the total population was sourced from the WDI measures in number.

Population Growth Rate (POPGR) measures the annual growth rate of the number of people living in a country (Population growth (annual %)). The total population was sourced from the WDI.

Employment (AEMP) proxied by employment to population ratio, this is the proportion of a country's population that is employed. Ages 15 and above are generally considered the working-age population. Employment to population ratio, 15+, total (%) (modelled ILO estimate), sourced from the WDI.¹

Gross Domestic Product Growth Rate (GDPGR) is the annual percentage growth rate of GDP (GDP growth, annual %) at market prices, sourced from the WDI.

3.2 Empirical Model

The study was motivated to examine the extent to which the provision of social protection to the teaming African population will help reduce poverty and inequality in the region, which has not been done in the literature to the best of authors' knowledge. Among the theories reviewed, this study is built on the social exclusion and the livelihood portfolio theories that seem to match the discussion and analysis of the provision of social protection services to curb poverty and inequality. The model for the study draws insight from the empirical study of Adeleye and Eboagu (2019), Matthew et al. (2019a, b), Osabohien et al. (2020); Osuma et al. (2018), Iwejingi (2011). Iwejingi (2011) identified human population growth as an underlying problem for poverty and inequality across the African continent.

Therefore, the estimable baseline model is depicted as:

$$\log Y_{it} = f(SOP_{it}, POP_{it}, EMPOLY_{it}, GDPGR_{it},) \quad (1)$$

Equation (1) specifies the panel model in its implicit form that is estimated using the fixed and random-effects model. The insight of this model was derived from the empirical works of Adeleye and Eboagwu (2019) and Osuma et al. (2018). The contribution of this study to the extant literature is that the study examined how poverty and inequality will be controlled through the provision of effective social protection policies in Africa.

From Eq. (1), the variables are in their log form, which could be explicitly represented as:

¹ Another variable that could affect poverty and inequality, which would have been included is education. However, we opine that education is embedded in employment. This understanding is crucial as education influences employment process because the level of education strongly correlates with employment (Osabohien et al. 2019; Asongu et al. 2019).

$$\log Y_{it} = A.SOP_{it}^{\Omega_1}.POP_{it}^{\Omega_2}.EMPLOY_{it}^{\Omega_3}.GDPGR_{it} + \mu_1 \quad (2)$$

Equation (2) is the explicit log form, which can be linearised as shown in Eq. (3)

$$\log Y_{it} = \Omega_0 - \Omega_1 \log SOP_{it} + \Omega_2 \log POP_{it} - \Omega_3 \log EMPLOY_{it} - \Omega_4 GDPGR_{it} + \mu_{it} \quad (3)$$

From the model, Y is the dependent variable, representing two key dependent variables (poverty and inequality); SOP represents social protection (one of the key independent variables); and POP represents the population (total population and population growth rate). $EMPLOY$ and $GDPGR$ employment and growth rate of gross domestic products, the control variables. Four social protection variables (which covered the three main components of social protection- social assistance, social insurance, and labour market interventions) are included in the model, as shown in Eq. (4) with the incorporation of the variables.

$$\log Y_{it} = \Omega_0 - \Omega_1 \log BHR_{it} - \Omega_2 \log EPR_{it} - \Omega_3 \log PFSIE_{it} - \Omega_4 \log SOPR_{it} + \Omega_5 \log POP(T)_{it} + \Omega_6 \log POP(GR)_{it} - \Omega_7 \log EMPLOY - \Omega_8 GDPGR_{it} + \mu_{it} \quad (4)$$

From the double-log explicit form of the model shown in Eq. (4): Where $Y=2$, representing the two significant independent variables (population and poverty which, disaggregated in the analysis). Poverty was captured by poverty headcount at US\$1.25 purchasing power parity (PPP) 2005. BHR is building human resources, EPR is equity of public resource use, $PFSI$ is the policy for inclusion and equity, $SOPR$ is social protection rating, $POP(T)$ is the population (total), $POP(GR)$ is the population (growth rate). $EMPLOY$ means employment; $GDPGR$ means a growth rate of gross domestic products. The variables are in their log form (except $GDPGR$ and $POP(GR)$ because they are already in rates) to bring them in the same unit of measurement and ensure that the estimates are Best Linear and Unbiased–BLUE (Ejemeyovwi et al. 2018).

Ω_0 is the constant term; $\Omega_1, \Omega_2, \Omega_3, \Omega_4, \Omega_5, \Omega_6, \Omega_7,$ and Ω_8 are the parameters of the explanatory variables in the model to be estimated. The ‘a priori’ expectation is that the estimated coefficient of the explanatory variables should be negatively related to poverty and inequality, except population (total) and population (growth rate), this can be expressed mathematically as: $\Omega_0 < 0, \Omega_1 < 0, \Omega_2 < 0, \Omega_3 < 0, \Omega_4 < 0, \Omega_5 > 0, \Omega_6 > 0, \Omega_7 < 0$ and $\Omega_8 < 0$. μ is the error term representing other important explanatory variables (s) that are not included in the model.

The line of argument is that poverty and inequality in Africa are results of high population growth rate, and the primary antidote to this menace is a social protection programme. Formal social protection systems in Africa have been less than satisfactory in its coverage and exclude a segment of the population which has to worsen poverty and inequality in the regions (Holmes and Lwanga-Ntale 2012). Therefore, effective social protection programmes and policies are methods of reducing poverty, inequality and vulnerability (Holmes and Lwanga-Ntale 2012), which has been lacking to some extent, in Africa.

In the model, i represent entities. Entities in the context of this study represent the 38 African countries selected from Central Africa (Angola, Cameroun, Central African Republic, and Chad),

East Africa (Burundi, Comoros, Congo Democratic Republic, Congo Republic, Djibouti, Ethiopia, Kenyan, Rwanda, South Sudan, Tanzania, Uganda, Zambia and Zimbabwe), North Africa (Mauritania, Sudan), Southern Africa (Lesotho, Madagascar, Malawi, Mozambique) and West Africa (Benin, Burkina Faso, Cape Verde, Cote d’Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, Togo. The justification for the choice of these countries is hinged on

the fact that they are listed in Country Policy Institutional Assessment (CPIA) social protection of the World Bank International Development Association (IDA). Also, they have the data for the variables of interest.

Also, in the model, t represents time. Time in the context of our study represents the 13 years (2005–2017) period covered in the study. Each of the variables in the model is logged (except population and GDP growth rates) to bring them to comparable units of measurement, as well as reduce the incidence of heteroscedasticity in the model (Ejemeyovwi et al. 2018; Onanuga and Onanuga 2015; Olokoyo et al. 2009).

3.3 Estimation Techniques

The specified empirical model is estimated with the use of fixed and random effect models complemented by pooled ordinary least squares (POLS) as seen in Adeleye and Eboagu (2019), Osuma et al. (2018), Greene (2007). This study explains these two (fixed and random effects) conventional panel data estimation techniques. The panel data, which combines both time series and cross-sectional dimensions, is estimated using a fixed effect or random-effect model. The assumption about the error term is that it helps to predict the nature of the regression model that is; whether the model is said to be random effects or fixed effects (Osuma et al. 2018; Hsiao et al. 1999). In a fixed effect regression model, the μ_{it} is assumed to be non-stochastically over i and/or making the fixed effect model analogue to a dummy variable model in one dimension. In a random effect model, μ_{it} is assumed to stochastically vary over entities i or time t requiring special treatment of the error variance (Hsiao et al. 1999).

$$y_{it} = X'_{it}\beta + \varepsilon_{it} \quad (5)$$

$$\varepsilon_{it} = v_{it} + u_{it} \quad (6)$$

In the fixed-effect model, the u_i are treated as constant specific to each unit of observation. The Least Squares Dummy Variable (LSDV) estimator gives the fixed effect, and $\hat{\beta}_{FE}$ is always consistent, but not efficient.

$$y_{it} = \alpha_i + X'_{it}\beta + v_{it} \quad (7)$$

In the random effect model, the u_i are treated as independently disturbed random variables with $u_i \sim iid(\mu, \sigma^2u)$. The Feasible Generalised Least Squares (FGLS) estimator gives the random effect, and $\hat{\beta}_{RE}$ is consistent and efficient if $E(u_i|x_{it}) = 0$.

$$y_{it} = \alpha_i + X'_{it}\beta + (v_{it} + u_{it}) \quad (8)$$

The Hausmann test was carried out to test if the random effect model is better than the fixed-effect model.

$$H_0 : \hat{\beta}_{FE} - \hat{\beta}_{RE} = 0; \quad H_1 : \hat{\beta}_{FE} - \hat{\beta}_{RE} \neq 0$$

If the Hausman test rejects the null hypothesis, it implies that the fixed effect remains consistent. In contrast, the random effect model is inconsistent, meaning that the fixed effect model is preferred. On the other hand, if the Hausman test rejects the

alternative hypothesis, it implies that fixed effect and random effect are both consistent and random effect is efficient, implying that the random effect model is preferred.

3.4 Sources of Data

The data for the variables included in the model were sourced from three different databases of the World Bank: Country Policy and Institutional Assessment (CPIA), International Country Risk Guide (ICRG) and World Development Indicators (WDI) as indicated in Table 1. The sample for this study contains 38 African countries (countries listed in CPIA data for social protection) for the period 2005–2017. The summary statistics of these variables are presented in Table 1 for the full sample and across regions.

From Table 1, for the full sample, the mean poverty is approximately 32%, and inequality is 1%. Across regions, the mean poverty for East Africa is 5%, Central Africa (27%), North Africa (17%), Southern Africa (63%), which 17% in West Africa. Inequality is 0.6 for the full sample, 0.5 in East Africa, 17.5 in Central Africa, 0.5 in North Africa, 0.6 in Southern Africa, and 0.5 in Western Africa. The results imply that across African regions, in terms of poverty, Southern African countries have the highest rate of the number of people living in poverty. In contrast, East Africa has the lowest rate of poverty. In terms of inequality, East, North and West Africa have the same rate of inequality (0.5). In contrast, Central Africa has the highest (17.5).

From Table 1, given the values obtained, it can be inferred that African regions lack effectively social protection; this is based on the measurement scale of social protection as discussed. In terms of population growth rate: East and Central Africa have an annual growth rate of approximately 3%, North Africa 3% and Western Africa 3%. With regards to employment, East Africa has the highest percentage of employment (63%) while Central Africa has the lowest, at 27%. In terms of the growth rate of GDP, West and North African have the highest rate of 5%, while Central Africa has the lowest of 1% annual growth rate of GDP. The mean of social protection for the regions; in terms of building human resource, Southern African has the highest coverage (3.6), while Central Africa has the lowest coverage (2.5). Going by the equity in public resource use, East Africa has the highest coverage (3.4), closely followed by Southern Africa (3.3). In contrast, Central Africa, North Africa and West Africa have the lowest coverage (3.1). Going by the policy for social inclusion and equity, Central Africa has the highest coverage (3.8). In contrast, North Africa and West Africa have the lowest coverage (2.7). Concerning the overall social protection rating, Southern Africa has the highest coverage (3.1) while Central Africa has the lowest coverage (2.1). The empirical results from the econometric analysis are presented in the next section of the study.

4 Empirical Results and Policy Implications

The result obtained from the analysis is presented in this section of the study. The Pooled Ordinary Least Squares (POLS) estimates are for the full sample for both poverty and inequality are presented in Table 2. In Table 2, both the main regression (column 1 and column 2) and robustness check (column 1 and column 2) is presented for the two outcome variables (poverty and inequality). While the sub-regional POLS is presented in Table 3.

Table 1 Summary statistics of variables. *Source:* Authors' Compilation 2019 using STATA 14 Software. *SD* standard deviation; the variables are not logged in the summary statistic

Variable	Measure, <i>Identifier</i> : Source	Full sample		East Africa		Central Africa		North Africa		Southern Africa		West Africa	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Poverty	Poverty headcount at US\$1.25 purchasing power parity (PPP) 2005; Source: ICRG	31.6	37.6	4.6	25.2	27	15.4	17.3	7.3	63.1	15.9	17.3	7.2
Inequality	Gini coefficient. Source: ICRG	0.6	0.2	0.5	0.2	17.5	12.7	0.5	0.1	0.6	0.1	0.5	0.6
Social protection	Building Human Resource (BHR), measured as 1 (poor) to 6 (strong); Source: CPIA	3.4	0.6	3.5	0.6	2.5	0.9	3.1	0.5	3.6	2.7	3.1	0.5
	Equity in the use of public Resource (EPR):- measured as 1 (poor) to 6 (strong). Source: CPIA	3.2	0.6	3.4	0.7	3.1	1.0	3.1	0.6	3.3	0.3	3.1	0.6
	Policy for social inclusion and equity (PFSIE): measured as 1 (poor) to 6 (strong); Source: CPIA	3.2	0.5	3.2	0.6	3.8	3.3	2.7	0.4	3.3	0.2	2.7	0.4
	Social Protection Ratings (SOPR): measured as 1 (poor) to 6 (strong); Source: CPIA	2.9	0.5	2.9	0.6	2.1	0.8	2.7	0.4	3.1	0.4	2.7	0.4
Population	Population, total. Source: WDI	7.2	3.6	2.7	2.7	27	15.4	2.0	1.6	1.6	9.0	1.9	1.6
	Population, growth rate (annual %). Source: WDI	2.9	1.9	2.7	0.6	2.7	1.4	2.6	0.3	2.4	0.8	2.5	0.3
Employment	Employment to population ratio, 15 +, total (%) (Modeled ILO estimate). Source: WDI	64.6	11.9	66.8	11.9	27	15.4	41.5	0.7	71.7	17.8	41.5	0.7
GDP	GDP growth (annual %). Source: WDI	4.7	5.1	5.1	6.2	0.8	0.4	4.9	4.3	4.7	2.7	4.9	4.3

Table 2 Results from full sample POLS analysis. *Source:* Authors' Computation 2019 using STATA 14 Software

Variable	Poverty model				Inequality model			
	Main regressions		Robustness checks		Main regressions		Robustness checks	
	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
Constant	4.1931 ^a (0.3401) [0.0000]	3.0404 ^a (0.4624) [0.000]	2.5987 ^a (0.4300) [0.0000]	3.0404 ^a (0.4430) [0.0000]	5.0056 ^a (0.4679) [0.0000]	5.4194 ^a (0.5076) [0.0000]	5.0056 ^a (0.2902) [0.0000]	5.4194 ^a (0.235) [0.0000]
Building human resources		-0.2528 ^c (0.2862) [0.037]		-0.5804 ^b (0.2997) [0.0530]	1.3657 ^a (0.3739) [0.0000]	-0.1015 ^b (0.4993) [0.0250]	-0.3165 ^a (0.3208) [0.0000]	-0.1158 ^a (0.4022) [0.0060]
Equity of public resource use	-0.8628 ^a (0.32470) [0.0008]		-0.8628 ^a (0.3365) [0.0100]		-0.7355 ^b (0.3142) [0.0190]	-1.0609 ^a (0.3739) [0.0040]	-1.0609 ^a (0.2006) [0.0000]	-1.0609 ^a (0.2006) [0.0000]
Policy for social inclusion	-0.3764 ^b (0.2312) [0.0104]		-0.3764 ^b (0.2980) [0.0207]			-0.2090 ^c (0.3650) [0.056]	-0.2094 ^a (0.1967) [0.0000]	-0.2094 ^a (0.1967) [0.0000]
Social protection rating		-0.5804 ^b (0.2710) [0.0320]		-0.5804 ^c (0.2997) [0.0530]	-0.2619 ^a (0.3486) [0.0000]		-0.2610 ^a (0.3470) [0.000]	
Population, total		-0.0122 ^c (0.0486) [0.0800]		-0.0123 ^c (0.0486) [0.0810]		-0.0506 ^b (0.0535) [0.0351]		-0.0506 ^b (0.0461) [0.0270]
Population growth rate	0.0018 ^a (0.0003) [0.0000]		0.0018 ^a (0.0003) [0.0000]		-0.0006 ^a (0.0004) [0.0000]		-0.0006 ^b (0.0003) [0.0510]	-0.000 ^c (0.0003) [0.0450]
Employment	-0.2686 ^a (0.0460) [0.0000]		-0.2686 ^a (0.0285) [0.0000]		0.1355 ^a (0.0520) [0.0090]		0.1355 ^a (0.0600) [0.0240]	
GDP growth rate	0.0004 ^a (0.0003) [0.0245]		0.0004 ^a (0.0003) [0.0349]			0.0006 ^b (0.0004) [0.0910]		0.0006 ^b (0.0004) [0.0110]

Table 2 (continued)

Variable	Poverty model				Inequality model			
	Main regressions		Robustness checks		Main regressions		Robustness checks	
	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
<i>Diagnostics</i>								
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observation	468	468	468	468	449	440	440	440
R ²	0.7881	0.8414	0.7780	0.8414	0.7540	0.5405	0.5405	0.8762
Wald $\chi^2(5)$	108.23	61.44	830.22	144.07	136.11	124.96	136.11	118.42
Prob > χ^2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	0.0000
'A priori' expectation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	No	No	No	No	No	No	No	No

0 and [] represents standard error t-statistic respectively. a, b and c mean that coefficients are significant at 1%, 5%, and 10% respectively. Variables are in their log form

Table 3 Results from the sub-regional POLS analysis. *Source:* Authors' Computation 2019 using STATA 14 Software

Variable	Poverty				Inequality				
	CA	EA	NA	WA	CA	EA	NA	WA	
Constant	38.8548 ^a (7.6074) [0.0000]	0.6027 ^a (0.0223) [0.000]	24.9196 (1.47.5939) [0.1700]	17.3118 ^a (0.5650) [0.0000]	3.0926 ^a (0.8967) [0.0001]	0.4229 ^a (0.0608) [0.0000]	0.2581 ^a (0.0692) [0.000]	5.3221 ^a (0.542) [0.000]	1.9201 ^a (0.7390) [0.0009]
Building human resources	-0.3518 ^b (17.100) (0.0400)	-0.0243 ^b (0.0096) [0.0120]	-0.1679 (6.8232) [0.5410]	-0.2846 ^a (0.3198) [0.0001]	-0.0523 (0.7743) [0.946]	0.0125 ^b (0.0116) [0.0008]	-0.0009 ^a (0.0002) [0.0000]	0.8428 (1.597) [0.530]	0.0040 (0.0236) [0.8660]
Equity of public resource	-0.7140 (2.8615) [0.9500]	-0.0005 ^b (0.0090) [0.060]	-0.0850 ^c (9.0099) [0.0450]	-0.4780 ^a (0.3406) [0.0000]	-0.1791 (0.5263) [0.7340]	-0.0131 (0.0101) [0.3012]	-0.0020 (0.0111) [0.8521]	-0.0242 ^b (0.230) [0.001]	-0.0119 (0.0092) [0.1970]
Policy for social inclusion	2.031133 (1.3515) [0.7251]	-0.0301 ^a (0.0211) [0.0000]	-0.0628 ^b (0.0093) [0.0100]	-0.0617 ^c (0.1115) [0.0580]	0.7042 (0.6153) [0.2520]	0.0098 ^b (0.0253) [0.0390]	-0.0159 (0.0267) [0.5520]	3.58031 (1.9400) [1.8500]	-0.0792 ^b (0.0620) [0.0202]
Social protection rating	-0.3473 ^a (0.7929) [0.0030]	-0.5804 ^b (0.2710) [0.0320]	-0.4262 (0.5703) [0.6801]	-0.6719 ^a (0.3262) [0.0000]	-0.5136 ^b (0.6780) [0.0449]	0.0001 ^b (0.0030) [0.0400]	-0.0020 (0.0016) [0.2070]	-0.5825 ^a (0.0068) [0.0000]	0.0081 ^c (0.0114) [0.0478]
Population, total	0.1966 ^b (0.1152) [0.0490]	0.9510 ^a (0.8011) [0.0000]	-4.9507 (3.0770) [1.6200]	-0.2732 ^b (0.1109) [0.0140]	0.0086 ^a (0.1632) [0.0050]	0.0094 (0.0038) [0.4600]	1.2510 (1.9911) [0.0000]	0.3448 (0.1751) [1.9700]	0.0096 (0.0060) [0.1130]
Population growth rate	0.2821 ^a (0.1089) [0.0100]	0.0017 ^b (0.0053) [0.0320]	4.6053 (8.5926) [0.5410]	0.4306 ^b (0.3741) [0.0250]	-0.0440 ^a (0.0107) [0.0000]	0.0014 (0.0040) [0.3600]	0.0143 ^b (0.0068) [0.0360]	0.4441 (0.9995) [0.5400]	0.01916 ^c (0.0116) [0.0490]
Employment	-0.0497 (0.1486) [0.3400]	-0.0004 ^a (0.0002) [0.0000]	2.3056 (3.0964) [0.7400]	-0.4060 ^a (0.5680) [0.0000]	-0.0536 (0.1932) [0.7810]	-0.0004 ^a (0.0003) [0.2800]	-0.0079 ^a (0.0022) [0.0010]	-0.0198 ^b (0.0115) [0.0470]	-0.4231 ^a (0.1692) [0.0010]
GDP growth rate	0.0162 (0.1238) [0.1300]	-0.0003 ^c (0.0007) [0.0480]	0.2064 ^b (0.2458) [0.0401]	0.0070 ^c (0.0035) [0.048]	-0.0072 (0.0109) [0.5040]	-0.0004 (0.0003) [0.1700]	-0.0001 (0.0003) [0.7440]	-0.0198 (0.0206) [0.3360]	0.0001 (0.0003) [0.5990]
<i>Diagnosics</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3 (continued)

Variable	Poverty					Inequality				
	CA	EA	NA	SA	WA	CA	EA	NA	SA	WA
Observation	49	121	56	46	46	49	121	56	52	52
R ²	0.9918	0.7535	0.7480	0.8629	0.8875	0.9260	0.6200	0.9694	0.6745	0.8644
Wald $\chi^2(5)$	78.51	61.44	53.45	144.07	134.11	28.75	10.88	21.95	121.19	121.19
Prob > χ^2	0.0000	0.0000	0.0000	0.0000	0.0019	0.0000	0.0000	0.0050	0.0000	0.0000
'A priori' expectation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	No	No	No	No	No	No	No	No	No	No
Robust SE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

() and [] represents standard error and t-statistic respectively. a, b and c mean that coefficients statistically are significant at 1%, 5%, and 10% respectively. Variables are in their log form, except the GDP growth rate and population growth rate

CA Central Africa, EA East Africa, NA North Africa, SA Southern Africa, WA West Africa

From the POLS results obtained in Table 2 (for full sample) and Table 3 (for sub-regional sample) for both poverty and inequality model, the four social protection indicators are having a negative relationship with both poverty and inequality across regions. The result showed that an increase in social protection policies (social protection/equity of resource use/policy for social inclusion) is positively and significantly associated with poverty and inequality reduction in Africa. In Table 3, our result showed that human resources development (building human capacity) through effective protection programmes relating to labour market interventions was associated with a 25.28%, and a 37% reduction in inequality across Africa (see Table 2). This may have a more significant impact in Central Africa as it is associated with a 36% and a 5% reduction in poverty and inequality, respectively in the sub-region (see Table 3).

Social protection policy for social inclusion (which comprises of social insurance and social assistance) on the average, 1% increase in social protection was associated with about 38% reduction in poverty and 21% reduction in inequality (see Table 2). Also, it may have the highest effect on poverty reduction in central Africa (71%) and West Africa (48%) (see Table 3). In essence, the results implied that social protection might be efficient in poverty reduction than inequality. Population and population growth rates are both positive and negatively related to poverty and inequality. It showed that the population (total population and growth rate) might increase poverty and inequality when not effectively harnessed and may also contribute to the reduction of poverty when fully harnessed depending on the ability of a region to harness its population. The above is affirmed from the results obtained in Table 3 (sub-regional analysis) as population growth has a different impact on both poverty and inequality in regions of study, in some regions, it has a positive impact, while in others, negative impact. In Southern Africa, population growth may contribute to about 34% reduction in poverty, but not significant in explaining the level of inequality. In Central Africa, increased population growth may simultaneously increase poverty by 28% but may reduce inequality by 44%. In East Africa, increased population growth may increase poverty by about 1%, but may not have an impact on inequality. In North Africa, an increased population may not have a significant impact on poverty but may increase inequality by 14%. While in West Africa, increased population growth may increase poverty and inequality by 43% and 11% respectively.

A population may be seen as a raw resource and can be appropriately harnessed through proper social protection and quality institutions to develop them into human capital for effective production (Ejemeyovwi et al. 2018). From the result, GDP growth rate for the full sample (see Table 2) and sub-regional sample (see Table 3), showed a positive relation to poverty and inequity, while employment is negatively related to poverty and inequality, this implies that GDP growth rate may not contribute to the reduction of both poverty and inequality depending on the region. In Table 3, similar to population, GDP growth's contribution to poverty and inequality varies across regions. In Central Africa, GDP growth may increase poverty by 16%, but may not be significant in explaining the level of inequality. In East Africa GDP growth may increase poverty by less than 1%, but reduce poverty by less than 1% in North Africa, GDP growth may increase poverty by 20%, but may reduce inequality by less than 1%, in Southern Africa, GDP growth may reduce poverty and inequality by approximately 19%, while in West Africa, GDP growth may increase both poverty and inequality by 1%.

Concerning employment; increased employment level may contribute to poverty reduction by 49% (Central Africa), 1% (East Africa), 40% (West Africa), but not significant in explaining the level of poverty in other regions. In the same manner, employment may contribute to the reduction in inequality depending on the region, 5% (Central Africa), but

in other regions, employment may not reduce inequality. It can be argued based on jobless-growth theory, referring to the realisation of economic growth without a corresponding increase in job creation required for poverty reduction (Martus 2016). The main issue relating to this is that the co-movement of these two components (employment and GDP growth) diverges for increasingly more extended periods (Bivens 2011). Moreover, thinking innovations in firm management often lead to structural change, though productivity may increase sharply, employment declines. Results from the Sub-regional POLS analysis is presented in Table 3.

4.1 Fixed and Random Effects Model

This section presents the results obtained from the fixed effects (FE) and random effects (RE) regression model, as shown in Table 4. The findings, which are quite similar to those, obtained in Table 2 and Table 3 for the POLS for both the full sample and sub-regional analysis, respectively. The findings are consistent in the sense that social protection indicators are significant enhancer in the quest for poverty and inequality reduction in Africa. As noted earlier, the growth rate in GDP may not be a good indicator to determine the welfare of a country.

The R-squared result (a diagnostic test) showed that the model is well structured, this is because R-squared of greater than 50% that the model is well-fitted meaning that the outcome variables (poverty and inequality) are properly explained by social protection and other explanatory variables included in the model. The probability values of 0.0000 show that jointly the variables are statistically significant in the model.

The findings of this study are in tandem with the results of Matthew et al. (2019a, b), Jalan and Ravallion (2003). Jalan and Ravallion examined the impact of piped water on children's health in rural India using the method of propensity score matching. The study examined the difference between households that have access to pipe-borne water and households that did not have access to pipe-borne water. Cross-sectional data for the 1993/1994 season was used with 33,000 rural households from 1765 villages were interviewed. The findings showed that the occurrence of diseases among rural households who did not have access to pipe-borne water was 21% higher than households with access to piped water. Similarly, Matthew et al. (2019a, b) noted that social protection could reduce in Africa.

The focus of social protection in the latter case goes beyond compensating those in poverty for their income shortfall. However, it includes an aspiration to have a broader developmental role. The rationale for this is that the persistent poverty faced by the poor is the main reason for their failure to take advantage of economic opportunity, which in turn can be explained, in no small extent, by their vulnerability to the impact of economic, social and natural hazards. This perspective further notes that in the absence of social protection, hazards impact directly on living standards, and they promote risk-averse behaviour among those in poverty, which is detrimental to their long-term welfare. This transformative approach to social protection aims to address concerns of social equity and exclusion that often underpin people's experiences of chronic poverty and vulnerability. This view extends social protection to areas such as equity, empowerment and economic, social and cultural rights, rather than confining its scope to economic risks.

Table 4 Results from the fixed and random analysis. *Source:* Authors' Computation 2019 using STATA 14 Software

Variable	Poverty			Inequality			
	Main regression		Robustness check	Main regression		Robustness check	
	FE	RE	FE	FE	RE	FE	RE
Constant	4.029 ^a (1.4606) [0.0110]	2.7304 ^a (0.4521) [0.0000]	2.3506 ^a (1.9507) [0.0000]	5.0451 ^a (1.6481) [0.0005]	5.4428 ^a (0.5669) [0.000]	5.4428 ^a (0.3486) [0.0000]	5.44281 ^a (0.3486) [0.0000]
Building human resources	-0.0437 (0.030) [0.974]	-0.2155 ^a (0.4090) [0.5300]	-0.8685 ^a (1.1407) [0.0000]	-0.6029 ^b (1.7480) [0.0340]	-0.0639 ^a (0.4990) [0.0033]	0.4128 ^a (0.3486) [0.0000]	0.0639 ^a (0.3728) [0.0004]
Equity of public resources	-0.2001 ^a (0.9105) [0.0022]	-0.7487 ^a (0.3238) [0.0021]	-0.7060 ^a (5.460) [0.0000]	-0.4479 ^b (1.1007) [0.0350]	-0.9710 ^a (0.3715) [0.0009]	-0.7018 ^a (0.1464) [0.0000]	-0.1081 ^a (0.1264) [0.000]
Policy for social inclusion	-0.1054 ^a (1.2230) [0.009]	-0.4900 ^b (0.3575) [0.017]	-0.6391 ^a (0.054) [0.0000]	1.91295 ^a (1.5720) [0.022]	0.3364 ^c (0.4274) [0.0531]	-0.2182 ^a (0.1464) [0.0000]	0.3364 ^a (0.1718) [0.0500]
Social protection rating	-0.6929 ^b (1.2960) [0.0503]	-0.4835 ^c (0.3085) [0.0567]	-0.0399 ^a (2.2708) [0.0000]	-0.7083 (1.709) [0.682]	-0.3473 ^a (0.4029) [0.0001]	0.4343 ^a (0.6990) [0.0000]	-0.7433 ^a (0.3699) [0.0000]
Population, total	-0.0011 ^a (0.1103) [0.0001]	-0.0024 ^a (0.0475) [0.0005]	-0.0795 ^a (7.5802) [0.0000]	-0.03911 ^b (0.1458) [0.0270]	-0.0369 ^c (0.0530) [0.0486]	-0.0609 (0.0467) [0.209]	-0.2369 (0.0467) [0.429]
Population, growth rate	0.0728 ^c (0.1511) [0.0480]	0.0017 ^a (0.0003) [0.0000]	0.0795 ^a (7.5809) [0.0000]	0.0002 (0.0010) [0.874]	0.0009 ^b (0.0003) [0.0210]	0.0075 ^b (0.0027) [0.0070]	-0.0009 ^b (0.0431) [0.0001]

Table 4 (continued)

Variable	Poverty			Inequality			
	Main regression		Robustness check	Main regression		Robustness check	
	FE	RE	FE	FE	RE	FE	RE
Employment	0.0102 ^a (0.1399) [0.0000]	0.2725 ^a (0.0469) [0.0000]	0.1024 ^a (7.9409) [0.0000]	0.2725 ^a (0.0300) [0.0000]	0.1120 ^b (0.0530) [0.035]	0.1120 ^c (0.0598) [0.010]	0.2210 (0.0985) [0.061]
GDP growth rate	0.0008 (0.0011) [0.7070]	0.0003 (0.0008) [1.0700]	0.0008 ^a (2.5411) [0.0000]	0.0003 (0.0004) [0.3830]	0.0006 ^c (0.0010) [0.090]	0.1120 (0.0598) [0.1210]	0.5170 (0.8901) [0.4321]
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	No	No	No	No	No	No	No
Observation	467	467	467	467	440	440	440
R ²	0.6070	0.8325	0.699	0.8325	0.0474	0.8500	0.8712
Wald Chi	108.80	107.80	109.80	843.28	140.06	109.80	440.06
Prob > χ^2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hausman (<i>p</i> value)	0.6825				0.6825		
'a priori' exp.	Yes	Yes	Yes	Yes	Yes	Yes	Yes

0 and [] represents standard error t-statistic respectively. a, b and c mean that coefficients are significant at 1%, 5%, and 10% respectively. Variables are in their log form, except the GDP growth rate and population growth rate

5 Conclusion

The expansion and coverage of social protection programmes and policies have not been uniformed and consistent across African countries. The organisation between strategies, national policies, programmes and activities towards the promotion of social protection over vulnerable individual have been a drastic challenge faced by many African countries. Establishment of cross-sectoral linkages and resource allocation guidance are valued due to the correlating strategies and policies which cannot be over-emphasised, giving room for social protection intervention effectiveness and efficiency.

The motivation to examine the extent to which the provision of social protection to the teaming African Population will help reduce poverty and inequality in the region is the main idea for the study. Analysis and collection of data were achieved from different data sources; World Bank: Country Policy and Institutional Assessment (CPIA), International Country Risk Guide (ICRG) and World Development Indicators (WDI). The sample for this study contains 38 African countries (countries listed in CPIA data for social protection) drawn from the Central, East, North, Southern, and West Africa for the period 2005–2017.

The study finds that social protection is proven to be an evidence solution to curbing poverty and inequality in Africa. The social assistance mechanisms are broadly utilised by developed and industrialised countries notwithstanding, effective employment of these mechanism exists in developing countries, predominate in Africa are; social pensions, in-kind transfers, public work programmes and cash transfers. Contributory programmes such as social insurance scheme aids in risk reduction towards shock events as its beneficiaries financially contribute regularly to join and maintain the scheme. Although, social protection appears to be an essential strategy for reducing, to a more considerable extent, poverty and, to a relatively lesser extent, inequality in Africa, there are also regional variations. It suggests that the type(s) of social protection policies may need to differ from one region to the other.

In sum, a balance on public policy for social protection that links the ex-ante measures in reducing the impact of shocks when occurring (e.g. broadening the income horizon of those in rural communities); well-designed measure which averts shocks with dissentious effect on the less privileged, household welfare (health care prevention against epidemics, flood guiding, adequate macro and trade policy). Social risks should be considered with great attention and the (re)engineering of the persons affected into the marker force and society at large. Schemes, such as mandatory and voluntary insurance are intertwined, and its contributions are of great essence, as social protection programmes do not operate in isolation.

The implications of the study findings from the study include (1) a budgetary line should be adopted and guaranteed through national resources when considering the long-term funding for the social protection, revisiting and reconstructing existing social protection programmes; (2) shocks from the economy and global finance can be safeguarded by the utilisation of social protection instruments. In conclusion, adequate strengthening and coordination of the support for the financial maintenance of social protection should be ensured by African countries. Above all, the social protection programme should hold a couched for effective delivering impact assessments, monitoring and evaluation to ascertain the extent to which social protection is delivered to the expected individuals.

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